

ANNALS of SURGERY

A Monthly Review of Surgical Science and Practice

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ANNALS *of* SURGERY

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THE OPPORTUNITIES AND RESPONSIBILITIES OF THE SURGEON*

BY JOHN M. T. FINNEY, M.D.

OF BALTIMORE, MD.

OPPORTUNITY and responsibility are twin sisters and inseparable. The surgeon has unequalled opportunities to relieve suffering and to save life. His responsibilities are correspondingly great. Of him it can be truly said "he holds the life of his patient in his hand." No conscientious surgeon can escape the realization of this responsibility. Contrary to common belief, instead of becoming less keenly felt with advancing years and widening experience, the responsibility continually weighs more heavily in consequence of a fuller appreciation of the true significance of a surgical operation. Certain factors are concerned in every properly conducted operation; a carefully taken history, a thorough physical examination, and such special tests as may be requisite to a correct diagnosis; sound judgment, perfect asepsis, the necessary technical skill and, almost equally important, a properly directed after-treatment. In the carrying out of these details there are many opportunities for error which are often difficult and at times impossible to control. In order to guard against these as fully as possible, the utmost patience and care in carrying out the minutest details must constantly be employed. Hence, in dealing with problems of the gravest import to humanity, involving, as they do, health and happiness, life and death, there is required in their solution the application of unusual judgment and skill. The truly successful surgeon combines the qualities of self-reliance and initiative with experience and broad medical conceptions. However, there is little chance for us to become puffed up with pride and satisfaction, no matter how enamored we may be with our calling and our accomplishments, because we know too well our limitations and our failures. We like to think that surgeons are men of decision and action, accustomed to deal promptly with difficult problems, to overcome obstacles; resourceful, courageous, sympathetic, kind, and thoroughly human. But, at the same time, we are not blind to the fact that there are many ways in which our activities as professional men may be amplified and extended in order to make them more effective and more helpful to the general public.

* Presidential address, delivered before the American Surgical Association, May 1, 1922.

I venture to direct your attention to a general consideration of a few of these phases of our professional life.

We shall consider the opportunities and responsibilities of the surgeon under four headings, as they affect respectively the public, the patient, the profession, and the surgeon himself.

The subject chosen for this address may perhaps appear to be rather vague and general. However, after considering the various topics that appeared at all suitable for this purpose, none seemed quite so appropriate as a review of some of the opportunities and responsibilities of the surgeon which are more or less intimately concerned with his professional life. The time, the period of beginning recovery from the effects of the war; the place, the Capital of the Nation; the occasion, the Congress of American Physicians and Surgeons, all combine to direct our thoughts into channels other and wider than those strictly professional, and cause them to dwell for a moment upon matters of vital importance to the nation.

In the language of the familiar hymn, "We are living, we are moving in a grand and awful time." The world has just passed through the most profound political upheaval in its history. Social structures have been shaken to their foundations by wars and rumors of wars. Many individuals, groups and organizations of men, comprising in some instances the controlling forces of nations, have temporarily lost their orientation and are floundering in the quagmires of doubt and despair, or are futilely chasing will-o'-the-wisps of false doctrines and impractical theories of political economy and government.

One has but to look around in our own country as well as abroad, to see on every hand evidences of social unrest and mutual distrust between classes and nations. The gaunt figures of famine and pestilence are stalking abroad, in some portions of the world almost unopposed. Anarchy and agitation are here and there to be seen raising their ugly heads. It requires more than the average optimism to enable one to retain his equanimity and to contemplate the future with undaunted confidence.

This is the situation that confronts us as Americans, as educated men, members of a profession boastfully proclaimed by some as "the learned profession," a profession that has ever stood for the highest and best in human aspirations, whose idealism and altruism are its proudest heritage and its most distinguishing characteristics.

In a crisis such as confronts us at this moment, to whom is society to turn for aid and guidance? From what other source can a satisfactory solution of its manifold and perplexing problems be found than from its educated, thinking men? We as members of this favored class, to whom much in the way of opportunity has been given, owe much to society in return. In a strictly professional way we may have fulfilled this responsibility, some perhaps in large measure. But in the still larger sphere of good citizenship, of sharing in the responsibilities of government, of making our influence felt

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upon the side of civic righteousness, we have, as individuals or as a profession, little to show in the way of accomplishment. We must plead guilty to the charge frequently made against us, namely, lack of interest. In response to a fine professional consciousness overjealously guarded, perhaps, we have stood too long aloof from active participation in public affairs, and have left to others, not always so disinterested, the management of civic matters, of great importance to us as individuals, to the communities in which we live and to the nation. How often have we stood in silence and acquiesced in unfortunate settlements of public questions when the proper solution could have been brought about by the aid of enlightened medical opinion. The time has arrived for us, as a profession, to forsake our exclusiveness and to enter more actively into public affairs; to make our influence felt in the decision of questions involving the welfare of mankind. The interests of medical men, no matter what their specialty, should be as broad as humanity itself, since they have so many points of intimate contact with the public. There are few civic questions that do not interest us primarily as citizens and in the settlement of which we are not concerned. There is nothing in our code of ethics to prevent active participation by physicians, individually or collectively, in public affairs, not directly as politicians (everyone abhors the political doctor), but as public-spirited men, representing a profession devoted to the service of mankind. The time is ripe for us to rededicate ourselves to that greater service and wider influence which is not bounded by a strictly professional horizon, but embraces the larger field of general human endeavor. It is our duty, in our respective communities, to take enough interest in public affairs to try to induce good men to accept nomination for public office, and in order to elect them, to go to the polls ourselves and induce others to do the same thing. Moreover, it should be our concern to see to it that our representatives in office live up to ante-election promises and really represent us.

Impotent in our splendid isolation, we have from time to time watched our representatives shamelessly prostitute their high offices for private gain, without lifting so much as a finger to prevent wrongdoing or to assure square dealing. Yet all the while we are deploring existing conditions and the lack of intelligent public opinion which would render such things impossible. Physicians should exert their moral force by actively interesting themselves in municipal, state, national and international affairs, not casting precedent entirely to the winds, but, on the other hand, not so firmly bound by it as to prevent them from taking their proper place in society and accepting and discharging their full share of the responsibilities of citizenship.

There is no scarcity of problems to engage the attention of professional men and women. Barker, in a recent address, discusses "The Wider Influence of the Physician." He points out that "one good of the great war was to emphasize sharply again that not only each one of us but each group of us is not separate from, nor wholly independent of, other persons and other groups, but must, of necessity, affect them and be affected by them, since all

individuals and all groups are but parts of one great whole, the world of men and the onward movement of life. Physicians at least as quickly as any other group will accept realization of self in the service of society as their ideal of personal success. In order to achieve the highest self-realization and the greatest social service, each member of society, besides doing some particular kind of work especially well, must actively and heartily participate in common life. Those physicians and surgeons will do most to promote the advance who first do the best practical, technical work of which they are capable, and, secondly, exert their influence, wherever possible, toward the better organization of society as a whole."

There are many problems now engaging national and international attention in the solution of which the medical profession could render service of incalculable value to mankind. The weight of its united opinion could, for instance, satisfactorily determine the settlement of public health measures now under consideration, *e.g.*, the supervision and control of food supplies, urban and rural sanitation, child, school, personal, social and industrial hygiene, to which may be added many kindred subjects that affect community life, even the much vexed question of the enforcement of prohibition. Moreover, medical men disinterested as they are, seeing as they do both sides, could help greatly in bringing about between employers and employees the mutual understanding and open dealing needed to insure industrial peace and progress. This list of opportunities might be extended almost indefinitely. However, one other question only will be mentioned in this connection because it intimately concerns all individuals in all nations. It has to do with the prevention of future wars by a just settlement of the problems growing out of the late war.

Members of the medical profession entered the service during the war more largely than did those of any other profession, and have for this reason fairly earned the right to be heard. Moreover, through experience and observation they alone can tell the full extent of the mental and physical disabilities caused by war, and the terrific human wastage resulting therefrom.

What more effective indictment could be brought against war and its attendant barbarities than that which could be drawn up against it by the medical profession? Fortunately, the world conscience is seemingly at last becoming aroused and tardy efforts are being made, as shown by the recent peace conference held in this city under the auspices of our own government, to retrieve in some small measure what was the real tragedy of the war so far as we as a nation are concerned, namely, the failure, from whatever cause, of our country to assume the leadership of the world in establishing the principle of righteousness in all international relations, which is the only sure foundation for a just and lasting peace.

By common consent, at the present moment there is no question confronting the world that concerns so intimately every individual in every nation as a proper and just settlement of the many perplexing questions growing out of

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the late war, and the institution of effective measures to prevent a repetition of its horrors. In the final analysis, the medical profession is in a position to wield a powerful influence in moulding public opinion in favor of universal disarmament and the establishment of the principle of arbitration by agreement between nations, thus doing away with the necessity for the continuance of huge armies and navies. Meanwhile, common prudence demands that we, as a nation, maintain a reasonable degree of preparedness, so long as other nations continue active preparations for war. Personally, I should like to see this Association of the leading surgeons of the country go on record as favoring those principles embodied in the League of Nations, the Quadruple Agreement, or in whatever form, so long as we surgeons, occupying the position that we do, go on record as actively identified with and heartily supporting this movement. For just as sure as the night follows the day, so surely will we or our descendants, in spite of narrow-minded politicians, reactionary senators and other obstructionists, yet see the day when the civilized peoples of the earth will be brought together into a society of nations, call it by whatever name you will, and this cruel, hateful thing that we call war, with its attendant appalling loss of life and limb will have been superseded by a less barbarous method of settling international disputes. But they say this is Utopian, idealistic, impossible of accomplishment. Nothing is impossible when public sentiment becomes sufficiently aroused in its support. The same thing was said of duelling, of equal rights for women, of national prohibition, and a hundred other things whose accomplishment has long since become an established fact.

I have dwelt thus at length upon this phase of the subject under consideration, indulging the hope that that magnificent spirit of unselfish devotion to country and to humanity which so characterized and controlled every activity during the recent war, may be again revived in all of its unselfish glory, and so inspire the minds and hearts of all good citizens, including the members of our beloved profession, that they may cast off the shackles of ultra conservatism and professional isolation and rise to the full heights of leadership in affairs other than those strictly professional for which, by training and by influence, they are preëminently fitted.

What the world needs to-day in order to lift it out of the terrible state of disorder and unrest in which it finds itself is the leadership of men of vision, with high ideals, unselfish, with faith in God, in mankind and in the future; men of discernment who have learned in the school of life that most important of all lessons, namely, that the only permanent solution of the grave problems, both national and international, with which we are now confronted is the practical application of the principles of the golden rule; who know that the only way in which to overthrow and permanently overcome the forces of evil is by supplanting them with something better, and who have the initiative and the ability to carry out their ideas. Their war and peace records show that the Fellows of the American Surgical Association possess these qualities. Thus far our leadership has been largely directed toward the

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advancement of surgery. May we not now devote our attention and energies no less in this special direction, but be willing so to extend our sphere of usefulness as to include active coöperation in civic and national affairs? Those splendid lines of J. G. Holland apply here with especial force:

"God give us men! A time like this demands.
Strong minds, great hearts, true faith and ready hands,
Men whom the lust of office does not kill;
Men whom the spoils of office cannot buy;
Men who possess opinions and a will;
Men who have honor and who will not lie;
Men who can stand before a demagogue
And scorn his treacherous flatteries without winking.
Tall men, sun-crowned, who live above the fog
In public duty and private thinking."

The responsibility of the surgeon to his patients demands that he should fit himself in every way possible to render the most beneficent service to those who entrust themselves to his care. Every surgeon appreciates the greatness of this demand in these days of rapid development along so many lines. Even with constant reading, there is such a mass of new material continually accumulating that it is impossible for a busy man to do his work and at the same time keep up with the literature. A satisfactory solution of this problem remains to be found, although various remedies have been offered in the shape of literary abstract bureaus, journal clubs and the like.

Although the necessity of keeping abreast of continuous advances in medicine and surgery is burdensome, the opportunities presented to make real contributions to medical or surgical science were never greater. New vistas are being continually opened as knowledge advances. Think of the many problems awaiting solution in the special field of surgery. Take, for example, just one, that of cancer. No greater service can be rendered mankind than the discovery of the cause, prevention and satisfactory treatment of this great scourge. The stimulus furnished by the joint responsibility and opportunity that are ours should urge us to utilize our time and talents to the utmost in order that individually and collectively we may contribute more than our quota to progress and achieve even higher standards than those set by our predecessors.

The surgeon, if he would but make the effort to gain the confidence of his patients, may render needed service other than strictly professional. He may, for instance, share the burdens inseparable from a surgical operation; he may help to relieve the nervous strain and apprehension associated with entering a hospital as a patient. By the exercise of tact and consideration, he can lessen the dread of the operating-room and anæsthetic, often more formidable than the operation itself. Likewise the shock of bad news concerning unfavorable operative findings and results may be softened and minimized. Such opportunities as these and many more are being continually presented to us to render invaluable service to those in need. Too often the science and art

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of surgery so engage our attention that there is little time left to give to the development of the more personal side. Surgeons are so engrossed in operating-room and hospital, in office consultations and in their daily rounds, that little time or thought is given to other and less conventional aspects of professional life. Let us never forget that a surgeon's whole duty is not done when he sends a patient home with a healed wound. It is possible to have as an end result a perfectly healed wound and permanently impaired function. The war taught us, if it taught us anything new in surgery, that restoration of function is one of the most important parts of the surgeon's duty. It is not enough simply to see and perfunctorily to examine a patient as just another more or less interesting problem to be solved. The true surgeon as a lover of his fellow-men will not be content to view his patient from this standpoint alone and then mechanically to operate upon him and let it go at that. He will render whatever additional aid and comfort may be in his power. These so-called little things are often really the big things, those that truly count, and which in the last analysis go so far toward making life worth the living for both the patient and the surgeon. It is a pity that we think ourselves too busy to improve opportunities to render little personal attentions to patients and their friends that are frequently remembered and valued long after the more showy professional services have been forgotten.

Few surgeons are competent to carry out satisfactorily all the details involved in modern surgery. The increasingly complex character of the surgeon's duties compels specialization if he wishes thoroughly to master any particular branch and thus be able to give the best service to his patients. The diagnostic clinic has come into being in response to this demand. Coöperation and group effort in some form are essential nowadays to make a complete diagnosis and to meet therapeutic requirements. Here is another responsibility of the surgeon, satisfactorily to work out his part in this comparatively recent development. Group medicine has come to stay. It has many possibilities for good, but it has equally great possibilities for evil, many of which already are being realized. The future must determine how best to regulate and control this new phase of practice.

The patient has the right to expect of his special surgeon more than average knowledge and ability. The surgeon, if he would meet these requirements, must be a leader, not a follower. He should never be content with mediocrity. Incessant effort is required in order to make this possible. It can be accomplished only by close observation of the work of other surgeons, obtainable by visiting their clinics, by reading, meditation, studies in laboratory, ward and clinic, and by regular attendance upon medical and surgical meetings. All are time-consuming and tend to prevent desirable participation in civic and other important duties and to curtail greatly the time which one might otherwise spend to his own and his patient's satisfaction and benefit in the more human side of professional activities.

In spite of all the difficulties that beset the surgeon's pathway and his

many worries and disappointments, there is none with whom he would be willing to exchange places, because no other profession offers comparable opportunities for personal service. In view of what surgery has been able to accomplish in the past and the wonders it can perform at the present time, like the pilgrims after their glimpse of the celestial city from the top of the delectable mountains, we should proceed hopefully in the prospect of still greater triumphs yet to come in the science and art of surgery, as the result of our labors and the labors of those properly trained by us to be our successors.

Among the more pressing of the immediate responsibilities resting upon the surgeon is that which involves the progress and development of his own profession. This cannot be dissociated from those other responsibilities of which we have been speaking because the interests of the patient, the profession and the surgeon are merged into those of the public. Whatever makes for the welfare of the one is intimately concerned in the welfare of all. Hence it is that we, as a profession, are vitally concerned in any proposed radical departure from generally accepted educational methods. The position of teachers and other leaders of surgical thought and practice with regard to changes and innovations in established modes of teaching should be neither reactionary nor too eager to accept unchallenged and as ex-cathedra proposed changes because they happen to emanate from apparently authoritative sources. It stands to reason that surgeons are best qualified to judge of the methods of teaching surgery. It is too early as yet to determine whether or not the strictly full-time plan will prove best for the teaching of surgery and other clinical branches. From the general proposition that the incumbent of a chair of surgery should devote his principal time and attention to teaching and to investigation, there can be no dissent. But will the best results be achieved by requiring professors of surgery to devote their entire time to departmental administrative work, to teaching and to research, to the practical exclusion of other outside interests? Upon this point there is room for decided difference of opinion. Indeed it is a question whether teachers in the non-clinical departments would not be the better for more frequent extra-mural contacts and greater personal competition.

Both from the standpoint of the teacher and the student there is a reasonable doubt about the ultimate effect of this method of teaching surgery. There is a well-grounded conviction in the minds of many competent to judge of such matters that the full-time plan, if followed rigidly, will have a narrowing effect upon those trained under it and will tend to develop the cloistered, institutional type as distinguished from the broad-minded man of affairs which has hitherto characterized the surgeon. Let us not be hypercritical, but retain an open mind and a receptive attitude toward any possible advance or improvement in present methods. We would be recreant to our trust if we did otherwise.

There is a responsibility resting upon the public as well as upon the pro-

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fession, an obligation that devolves upon both individuals and corporations that have amassed wealth to devote a portion of it to promote the study of disease and the advancement of responsible agencies engaged in the care of the sick and the relief of the suffering, such as hospitals, medical schools, research institutions and the like. The particular methods to be employed in the carrying out of this work should not, in consequence of these benefactions, become the object of dictation or control. However groundless may be the fear of such interference with institutional and academic freedom, unfortunately the impression has been created that there is danger lest in this way medical education may be too strongly committed to a course of action as yet only in the experimental stage and of which insufficient opportunity is as yet available to enable us to judge as to its real merit. By all means let us welcome assistance from every source and by its aid endeavor to advance medical education in general and the training of competent surgeons in which we are more especially interested, but let us not accept as a principle for universal application any new proposition until it has been thoroughly tested in institutions sufficiently well endowed and equipped to pass final judgment upon the experiment. Therefore, before committing ourselves to any revolutionary action in regard to medical education and surgical training, let us weigh carefully the opportunities that it offers for both good and evil, balancing the one against the other and be sure always to follow the Biblical injunction "prove all things, hold fast that which is good."

There is real danger lest in our zealous search after truth we may lose our perception of relative values and unduly stress one branch of knowledge to the detriment of others of perhaps equal, or even greater, importance. In that charming address, the last and one of the best of the many scholarly and delightful poems in prose that he has delivered, entitled "The Old Humanities and the New Science," Sir William Osler traces their interrelationship and makes clear the lack of conflict between them. In his inimitable style, he establishes their mutual dependence the one upon the other, if the best results are to be obtained, and indicates how the trend in modern liberal education is toward a closer union between humane letters and natural science.

In the broader and more humanitarian sense medicine is an altruistic profession. In the last analysis, this quality plays an important part in all professional activities. It controls the various relations of the surgeon to society. It determines his responsibility to his patients. Science, on the other hand, is impersonal. It deals with things, with problems, with facts, only incidentally and more or less remotely with people. From the direction which the newer and more scientific developments in medicine are taking, there is grave danger that the increased emphasis placed upon this important phase of the education of the doctor may cause the humanitarian and altruistic aspects of the subject to fail to receive due consideration. There is much in medicine besides scientific interest in the patient. There is something of value in the training and equipment of the doctor that science does not supply.

Let us see to it that the proper balance is maintained between the scientific and the humanitarian aspects of the subject.

Just what constitutes research and just how important a rôle it should play in the curriculum of the medical school are questions of prime importance. Relatively greater value is being attached to it now than ever before, and rightly so. The danger that confronts us as teachers, however, is that we may again lose our sense of proportion and magnify this one important function of the medical school at the expense of others. It should at all times be borne in mind that the most important function of the medical school is the training of public servants, the making of good doctors. If a list were to be made of the more evident tendencies of present-day medical education, it would include the glorification of research, the increased emphasis placed upon the allied sciences, chemistry, physics, biochemistry, etc., and the paying of less attention to the fundamental subjects of anatomy, physiology, pathology, bacteriology, therapeutics, etc., and the apparent leaving out of account the human element in the training of the medical student, in short, more theory and less practice. Have we not here a confusion of two ideas, namely, that of the medical school proper and that of the research institute? Are we quite fair to the student in failing to give him a sufficiently thorough background before expecting of him scientific research for which he may have no natural aptitude or may never become properly equipped?

The ultimate effect of this ultra-scientific development upon the profession will undoubtedly be to raise the general standard of intelligence. Physicians as a class will be better acquainted with the allied sciences, perhaps more highly educated than at present, but will they be better doctors? Will they be better able to diagnose and to cope with disease in all of its protean manifestations and to deal with correlated problems of patients wherein friendly interest and advice are often of equal or of even greater importance than attention to physical ailments. Are we not already overeducating our medical students in some respects, and may it not be that we are demanding too much of them? May we not be attempting to cram too much into their heads in a given time, so much, in fact, that they are unable thoroughly to digest it? The inevitable result is that many of them are being turned out of our medical schools with a mass of unassimilated, incoördinated facts, which they do not fully understand and cannot properly use. They are frequently unable to distinguish the really important from the unimportant; attempting to make original investigations when they are unable to recognize and correctly interpret many of the most common and familiar phenomena of disease. Doctor Osler, in the address previously cited, in referring to the extraordinary development of modern science and the consequent necessity for specialization, says: "Applying themselves early to research, young men get into the back waters far from the main stream. They quickly lose their sense of proportion, become hypercritical, and the smaller the field, the greater the tendency to megalomania." This explains many of the inferior contributions appear-

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ing in medical journals and masquerading under the guise of research. The fact that a certain series of operations was done upon dogs, does not make it scientific research any more than does the fact that another series done upon human beings prevents it from being classed as such. It all depends upon the circumstances under which each was done. The proper mental attitude, the scientific spirit and approved methods are all that is necessary to transform ordinary surgical routine into real investigation. As thinking medical men, teachers of surgery in our respective schools, it is our duty to foster research by stimulating the scientific curiosity of our students by the character of our own teaching and work and then suggesting to them ideas for further study. We should observe our students carefully and select out the few who have the true investigative spirit and the necessary persistence in order to take advantage of it, for they are indeed *rara aves*. Encourage these in every way and do not hamper them with conventional restraints. True genius never pulls well in double harness but does best when going alone. Cultivate and nourish the real investigator as you would a hothouse plant. In this way, by developing and making more productive the individuals specially endowed by nature, research can be better encouraged and greater progress be made than in the vain attempt to make investigators out of all students. The average student who makes up the mass of the profession can be well trained to take care of the sick. He can, at the same time, be given the right attitude of mind toward work, study, thought, research and the manifold opportunities and responsibilities of the profession toward society, and last, but not least, he can be taught his true relation to his patients, namely, that of service.

Let us, teachers of surgery, responsible for the proper training of students, strive to maintain in the curricula of our schools the proper balance between the science and the art of medicine and not make the mistake of diverting our medical schools from their legitimate function. Much of the difficulty in medical education to-day is attributable to the lack of a thorough understanding between those working in non-clinical and clinical departments. If each group would take the trouble to acquire an intelligent and sympathetic interest in the problems and the aims of the other, they would meet upon common ground to the mutual advantage of each, and so hasten the discovery and application of more effective means to combat disease. The fictitious barrier now existing between them would then quickly disappear. No one whose interests are purely scientific to the exclusion of the humanitarian should be in a medical school. His place is in a research institute. No one whose interests are purely commercial should be in medicine, his place is in business. Medicine has one big job, the prevention and alleviation of disease. Medical schools should devote their efforts to training those capable and willing to do this job.

When a medical student has been taught how to observe accurately, how to work honestly and what is the proper attitude of mind toward his fellows,

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both professional and lay, he may be safely trusted to work out his own salvation with the assurance that the best interests of the patient, the public and the profession will be safeguarded. The student so instructed will sooner or later find his proper level. Either the science or the art of medicine, or both, will claim him in response to the leading of the spirit that moves within him.

There is an outstanding evil of which we are all only too fully cognizant and that should be remedied. Public safety and the good name of the profession demand that the pernicious activities of daring but unprincipled operators who are attempting to do surgery without sufficient education or training should be curtailed because of the disastrous results inflicted by them upon their patients. You and I know how active they are, for we are being constantly called upon to repair the damage that they have done, not infrequently amounting to permanent disability or loss of life. It is an unpleasant task to wash our dirty linen in public, but our responsibility to our fellow-men and our regard for the good name of our profession require this Association to take some action, looking toward the solution of this unpleasant problem. The American College of Surgeons has already made a beginning in attempting to elevate the standards of surgery among its Fellows, by establishing certain requirements for membership, standardizing hospitals and in other ways. The Council on Medical Education of the American Medical Association has also done excellent work in this direction. But these organizations, working independently, cannot accomplish the desired result. Team work, the united and sustained effort of all responsible organizations will be necessary to accomplish results. Upon a former occasion, I have emphasized the evils of ill-advised and poorly-executed operations by untrained surgeons, especially in poorly-equipped private hospitals, where the worst execution is done.

Every one of us is aware of this fact, and there is no need for further elaboration here. These evils are sufficiently glaring and urgent to demand action by the responsible surgeons of the Nation. The chief evils referred to are: (1) That anyone licensed to practise medicine in any form may set himself up as a surgeon and operate upon anyone sufficiently ignorant or foolish to permit him to do so; (2) there is no properly constituted national authority to determine a candidate's fitness to practise surgery, to grant him a license or to supervise his work, and in case of sufficient cause, to cancel his license and prevent him from further operating.

Perhaps it is neither feasible nor desirable to exercise too close supervision, but some remedy can and must be found for existing evils. It is better that the initiation and supervision of necessary reforms should come promptly from the profession, or else the State may see fit to take the matter into its own hands and give another sorry exhibition of ill-advised action by well-meaning but misguided authority.

Organized effort is needed in order to bring about effective action. After mature deliberation, I would recommend that this Association appoint a com-

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mittee and request the appointment of similar committees by other representative bodies of surgeons and medical schools for the purpose of holding conferences to devise effective means of controlling the practice of surgery in the United States. In making this recommendation, we are well aware of the fact that at the present time, the educational facilities and the machinery necessary to remedy these evils are non-existent. But we are equally convinced that after a thorough study of the needs of the situation, a satisfactory plan can be devised by means of which prospective surgeons may receive adequate training under proper supervision and be properly certified to before beginning the practice of surgery.

What shall we say with regard to the opportunities and responsibilities of the surgeon as they primarily concern himself? This is an aspect of the subject that is usually given scant consideration. The surgeon, like his medical brother, is notoriously negligent, even reckless of himself, his interests, his health, his means, and at times even of his own reputation where that of his patient is concerned. In his zeal to fit himself and to keep himself fit to render service to his fellow-men, he forgets self and disregards the ordinary laws of health, which, added to intense mental and physical strain, tend to impair his usefulness and ultimately shorten his life. All of us are constantly offending in this respect.

Compared with other professions, the life of the surgeon is short. None but he knows the weighty responsibilities that he has to bear, the haunting fears and misgivings inseparable from his work, the questions of grave import that he is called upon to decide, frequently without opportunity for deliberation or consultation. How may the surgeon best conserve his time and energy? There are many ways in which this may be done. One only will be mentioned, it is the cultivation and practice of system in one's work. Nothing is more destructive of accomplishment than the lack of it. Listen to the words of Sir William Osler: "How can you take the greatest possible advantage of your capacities with the least possible strain? By cultivating system. I say 'cultivating' advisedly, since some of you will find the acquisition of systematic habits very hard. There are minds congenitally systematic, others have a life-long fight against an inherited tendency to diffuseness and carelessness in their work. A few brilliant Fellows try to dispense with it altogether, but they are a burden to their brethren and a sore trial to their intimates. I have heard it said that order is the badge of an ordinary mind. So it may be, but as practitioners of medicine, we have to be thankful to get into that useful class. Let me entreat you to take to heart what I say on this matter. Forget all else, but take away this counsel of a man who has had to fight a hard battle, and not always a successful one, for the little order that he has had in his life; take away with you a profound conviction of the value of order in your work."

These words were addressed to a class of medical students, but they also apply with equal, or even greater force, to us students of a more mature

growth, though I fear that for some of us at least the advice has come too late and will fall upon the deaf ears of habit-ridden men, confessing their sins, but like Sindbad with the "Old Man of the Sea," unable to throw them off.

A proper apportionment of our time between work, reading, study, investigation, meditation, travel, recreation, activities other than professional, etc., if consistently maintained, will result to an astonishing degree in increased productivity. One has but to look around among the Fellows of this Association in order to observe the beneficent influence of orderliness and system. And this is not all. I am sure we have all been impressed and stimulated, as we have followed our daily round of duties, by the unlimited opportunities as well as the grave responsibilities that are ours. We have also been impressed, too, no doubt, many times by the consciousness of how far we have fallen short of taking advantage of these opportunities, and how frequently we have failed to accept fully the responsibilities that are ours. On the other hand, it should not be forgotten that talent and capacity vary widely in different individuals as does opportunity. It is not what one has to start with that matters so much, as what one does with what one has.

"It's not the hand Fate deals you that counts in the game of life,
Mayhap born to poverty, to sorrow, toil or strife;
Or mayhap born to luxury and petted to beat the band.
It isn't the hand Fate deals you, it's the way you play your hand."

How often, in the course of our professional activities, have we not had the opportunity, indeed the privilege of observing consummate courage and fortitude displayed by some patient or loved one who cheerfully, with a smile on the face, has bravely fought to the finish a losing fight? Who has not been made a better man by such experience?

How far the opportunities and responsibilities that come to us all in varying measure may be met and taken advantage of is well illustrated by the accomplishments of one whose labors have only recently come to an end, one whom we are proud to claim as an Honorary Fellow of this Association, Major General William Crawford Gorgas, Medical Corps, United States Army. By his great work in the control of malaria, yellow fever and other tropical diseases, he has saved untold lives, rendered habitable large portions of the earth's surface and made possible the completion of that colossal undertaking, the Panama Canal. It was my privilege a year or two ago to be present at the wonderfully beautiful and impressive services held in Old St. Paul's Cathedral in London in honor of that great surgeon, splendid character and brave soldier. The signal honor accorded his memory and the recognition of the value of his work by the King of England and the English people were well deserved and will long be remembered by a grateful profession and nation. Such a career lies open to but few, because the one talent men are far more numerous than the ten, but such an example may well serve as an incentive and a goal toward which all may strive. The point of the whole

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matter is this, to be faithful in the few things or the many, to use well our one talent or our ten, to employ to the greatest advantage to humanity what we have, and then in the final reckoning it matters little whether we are classed in the one group or the other, we will have left mankind our debtor, we will have rendered some real service to our fellows, we will have made the world a better place for our having lived therein.

So, casting aside all disquieting regrets for the past and undisturbed by the uncertainties of the present, looking steadfastly into the future, let us take courage and, in the spirit of Ulysses, advance with confidence.

"Death closes all; but something ere the end,
Some work of nobler note, may yet be done.
'Tis not too late to seek a newer world,
Push off, and sitting well in order, smite
The sounding furrows, for my purpose holds
To sail beyond the sunset, and the baths
Of all the western stars, until I die."

END RESULTS IN CANCER AS INFLUENCED BY TYPE, REACTION, LOCATION AND AGE*

BY CHARLES H. MAYO, M.D.

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CANCER is the most dread disease of modern times, although as old as history. More of our citizens are destroyed by cancer in one year than were destroyed by our two years of war; the disease selects its victims, however, from the mature and aged rather than from the youth of the nation. Cancer apparently is increasing at a rate of about two and five-tenths per cent. a year. We have saved lives in infancy by preventing disease and thereby increased the number of persons who reach cancer age. The greatest loss from cancer is between the years of forty and sixty. Within the age limits of forty-five and fifty more women are afflicted than men, while from the sixtieth to the seventy-fifth year more men have the disease; that is, approximately three women are affected to two men, the difference being in the involvement of the organs of reproduction.

Within the last few decades continuous discussions of the cancer problem with reports from various investigators have greatly augmented our knowledge of the subject, and while the cause is still a moot question, it must necessarily be a force that will harmonize in all of its manifestations wherever found.

Cancer is found not only in man but in all manner of life, animals and plants; thus loss of function, and uncontrolled proliferation and migration of immature cells appears generally throughout nature. The disease and its destructive effects are so well known that the public is being educated with regard to it. Men with tumors and ulcers of the tongue and women with tumors of the breast are consulting physicians so much earlier than formerly that more than fifty per cent. of the lesions are found to be benign, and early treatment saves many persons from developing cancer. Undoubtedly also many lives are saved or prolonged even though the number of accessible, recognizable, or visible cancerous growths are in the minority.

Most investigators of cancer have been stimulated by preconceived ideas which they endeavored to prove. Brief reviews of hypotheses of cancer development are presented, that attention may be directed to the fact that these hypotheses harmonize more than might be expected if in each is considered a condition contributing to a local chemistry favorable to cell growth with other factors, such as environment and loss of cell control in one or several cells.

Environment and, apparently, acids are contributing factors in cancer.

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More than one-third of the cancers in men, and somewhat less of those in women, are found in the highly acid stomach; the acid large bowel is often affected with cancer, while the alkaline small intestine is but rarely affected. Acids due to degeneration, normally as in the reproductive organs, or abnormally, especially those due to degeneration of lipoids, and those due to irritation, are contributing factors.

As a result of the investigations of pathologists and biologists who have made a study of cancer, many hypotheses have been reported. It is doubtful if the world would be better off or the disease better handled could we temporarily accept any one hypothesis to the exclusion of others, which is now the viewpoint and hope of the public, derived, apparently, from the medical profession. The views of these investigators seem to harmonize in acceptance of regression or degeneration of the cells, of loss of function, and of proliferation, as processes in cancer, and of irritation as a factor either physical or chemical. Within the last few years a dissenting group of pathologists has disputed this generally accepted hypothesis and believes that it is not the functioning cell which starts cancer by degenerating or regressing but the immature, waiting, or repair cells of the embryonic type. The loss of cell control for the misplaced group is the factor in Cohnheim's theory of embryonic misplacement, in which group tissue control is placed with function, although this is only a possible factor, for benign tumor development is rarely seen and is unsatisfactory as an explanation of changes which occur in single cells. Moullin believes cancer starts in a single cell, although there is no reason to believe that several cells in the same area might not receive the same stimulus with like result. Waldeyer and Thiersch considered the loss of control to be due to the exhaustion of cells as a result of age, while Ribbert believed the loss of control to be due to isolation of the cells by inflammation, which is usually considered of bacterial origin. Ochsner voices the belief of many, in saying that the cause is undoubtedly the result of microbic action. Bacteria as an irritant should be considered in the light of their chemical output and not alone by their presence. Febiger has apparently caused cancer of the stomach in rats by giving *Spiroptera neoplastica*, and Smith in the development of plant cancer, crown gall, causes it by injecting *Bacillus tumefaciens*; he can also develop such growths by chemical irritation.

In considering the causes which stimulate cell growth we are reminded of the work of Jacques Loeb who fertilized sea-urchins' eggs by placing them in one per cent. butyric acid and sea water for one minute and then returning them to sea water, a positive evidence of the effect of chemicals in stimulating proliferation of cells. While several factors may have their place in the development of cancer, or may be considered essential, such as age, exhaustion of the cell, and loss of function and control, the chemical environment, however developed, is undoubtedly a most important stimulating force. The cells

of youth are resistant to cancer, but if once affected, the softer tissue and better circulation, vascular and lymphatic, render growth and metastasis more serious; thus, in a man of thirty-five years, cancer of the lip would make as much progress in a few months as a similar growth in two years in a man of eighty.

From the clinical standpoint great progress is being made in attacks on cancer. First, the publicity concerning the disease is resulting in a higher percentage of early operations. Second, the operations are more radical, or if radical operation is impossible or inadvisable, palliative operations with Röntgen-ray or radium treatment check the activity of growth.

Röntgen-ray and radium in the treatment of cancer have made marked progress in a very serious group of cases. When this form of treatment was first undertaken only those whose condition was too far advanced for surgery were considered suitable subjects.

The action of the Röntgen and radium rays on the malignant cell is identical, provided their wave-lengths are equal. The most penetrating rays of radium represent an electrical potential equal to 3,000,000 volts, while our latest transformers have a capacity of only 300,000 volts. In the treatment of malignancy, especially in the cavities of the body, radiation therapy is most effective when radium is applied directly to the tumor and Röntgen-rays to the possible regional and deep metastatic areas.

The action of the ray causes a complex physiochemical change in which the cell becomes oedematous, the nuclear substance fragments, and finally all powers of cell regeneration are lost; the debris is carried away by phagocytosis and replaced by connective tissue.

Many early and some late cases, according to location and type, have apparently been cured by such treatment. When vascularity is one of the features of the condition radium is most excellent. The end-result of both Röntgen and radium therapy is the development of fibrosis, which often changes the type of malignancy.

From the standpoint of the pathologist most important advances have been made. The immediate frozen section gives, within two minutes after removal, a true picture of the disease without chemical or embalming changes of tissue. Resistance to the growth is shown by lymphatic infiltration and round-cell activity which indicates the development of fibrosis, the extent of which gives more or less evidence of the results of this action and shows it to be one of persistence probably even from the inception of the growth. On the other hand, there may be no evidence of fibrosis, but a very active cellular growth with proliferation, a most fatal type, especially if not recognized and operated on early before the lymphatics are involved. The possibility or rather probability of the cure of cancer can be largely foretold by the pathologist: thus two individuals of the same age with cancer of the breast, stomach, or rectum,

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of the same period of growth, with the same extent of apparent glandular invasion, would have prospects of life following the same operation, very largely according to the presence of fibrosis in the one and its absence in the other. Mass evidence may be secured by investigating the late results of operation for cancer after years have passed, by means of slides, and preserved specimens of those who have died and of those who have remained well. If the evidence is there, the surgeon must divide the honors of success and the dismay of failure with nature's efforts. In the Clinic, MacCarty and Broders have found the later results following operation for cancer to tally very largely with the cell evidence.

THE SECONDARY MANIFESTATIONS OF MALIGNANT DISEASE*

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THE vagaries of the secondary manifestations of malignant disease are so remarkable one is puzzled, at times, to understand the laws which govern their development. The metastatic growths, often situate close to, or at a remote portion of the body from the primary growth, and occurring at varying intervals of time after the initial appearance or removal of a malignant tumor, form the immediate subject for discussion in this paper. The clinical application of known facts regarding the development of these secondary tumors becomes a matter of great importance in practical surgery. It is essential to study the more unusual manifestations of secondary growths; in many instances the key to the solution of a difficult problem in the life history of specific disease is found in the more or less exceptional case.

Metastasis Through Lymph Channels.—Secondary growth through lymphatic channels presents great variety in cancer of the breast. The clinical demonstration prior to operation of the existence or otherwise of invasion of the axillary lymph-nodes, may be impossible. On the other hand, the secondary tumor or tumors may not only far exceed the primary in bulk, but may become apparent before the primary tumor in the breast is discovered. Thus in a woman of forty-three a glandular growth was removed from the axilla which proved to be malignant: there was no evidence of tumor in the breast; ten months subsequently this woman again presented herself with a scirrhus cancer of the breast, some areas showing a medullary type, with additional cancer nodes in the axilla. The reverse of this picture was shown in a woman of seventy who had a tumor in the breast for six years. A radical operation was performed on a diagnosis of cancer. Scirrhus cancer was found in the breast, but the axillary glands, although enlarged, were entirely free from malignant development. In such cases the prognosis is good and this patient has remained free from recurrence after the lapse of four years.

Sampson Handley made an important contribution to this subject in his investigations regarding the secondary manifestations of breast cancer. His work, which is familiar to all those interested in the subject, was first presented in the Hunterian lectures before the Royal College of Surgeons in 1905; subsequently he published more extended observations in book form. He enunciated the view of continuous extension of growth along lymphatic channels and termed it "lymphatic permeation." This view was opposed to the "embolic" theory of the origin of secondary growths. His findings may be summarized as follows: He demonstrated continuous extension of cancer cells along lymphatic channels to the glands of the axilla and to the infra-

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clavicular and supraclavicular groups. He also traced a continuous chain of invasion to the pleura, the lungs, and to the opposite breast. He similarly accounts for bone metastases in the humerus, the ribs and the spine. Perhaps his most interesting observation is the invasion of the lymph channels from the breast to the epigastrium and the navel, hence by the lymphatics of the round and falciform ligaments to the liver. From these channels along the round and falciform ligaments cancer cells may bud off and become free in the peritoneal cavity and may lead to distant metastases in the intestine or in the ovary, the cancer cells being carried thither by the movements of the stomach and intestines or by gravity. The lymphatics of the diaphragm may be reached along the epigastric route and thus the rare implication of the retro-peritoneal lymph-glands and of the kidney is explained. Thus in long-standing cases of breast cancer these distant metastases are brought about, according to Handley, by continuous invasion along lymphatic channels.

There is some confusion regarding the significance of palpable glands in the axilla in a case of breast tumor. We regard it as one of several local signs suggestive of carcinoma and yet induration and enlargement of axillary glands are by no means pathognomonic of malignancy. Ewing would have us believe that the lymph-nodes undergo a process of change antecedent to the actual development of secondary metastasis, he states that for months or weeks the soil is prepared in lymph-nodes draining a primary focus of carcinoma. He describes the more recent changes as consisting of moderate swelling of the gland, diffuse hyperplasia, catarrhal exfoliation of sinus endothelium, multiplication of follicles, not uncommonly at a later period the nodes become atrophic and fibrous and may become extensively invaded by fat. The more recent changes he attributes to the absorption of toxic products from the tumor, autolytic and bacterial. This conception is not wholly in consistence with clinical observation. The changes in a lymph-gland antecedent to the production of a secondary cancer growth are more likely to be synchronously developed with and dependent upon changes in the breast

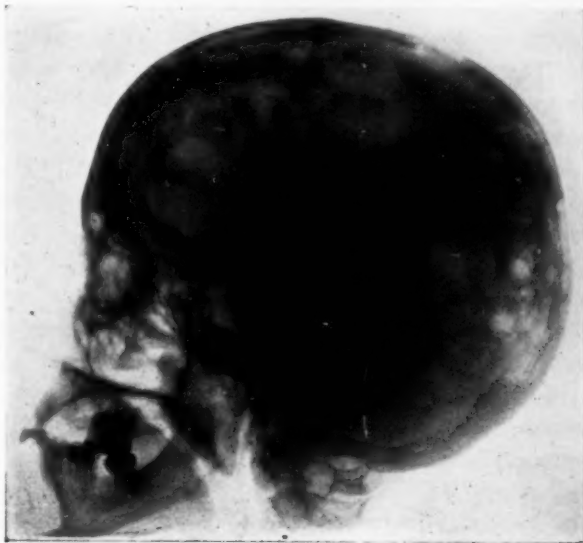


FIG. 1.—Woman sixty-three years of age, suffering from breast cancer metastases in cranial diploë three and a half years after radical operation on the breast.

which are antecedent to the development of a carcinoma in the breast. We frequently find such inflammatory hyperplasia in the glands in cases of chronic mastitis and we believe such cases often develop cancer both primary and secondary. The following case illustrates my point: A woman aged thirty-three had a nodular diffuse involvement of both breasts with enlarged palpable glands in each axilla. Both breasts were removed with the axillary contents. The right breast gave a typical histological picture of medullary cancer with metastases in the axillary glands: the left breast was the seat of chronic mastitis, the glands showing inflammatory changes, but neither in the breast nor in the glands was there any evidence of malignancy.

The palpable axillary gland may, in some instances, give us the chief evidence of the true nature of the case. In a woman of forty-nine a radical operation was performed on a clinical diagnosis of breast cancer. The pathologist reported chronic mastitis without malignancy. Through an accidental circumstance the axillary glands were lost sight of and were not examined for some days subsequently: undoubted cancer was found in the glands; the breast was again carefully searched and eventually a small focus of malignancy was found, surrounded by a large area of chronic inflammatory change. Among other things this illustrates the futility of trusting to a quick section in such a case.

On the other hand, carcinoma of the breast may in rare instances be responsible for distant metastases while the local lymph-glands escape. A woman of thirty-nine years of age came to me with a metastatic growth in the spine. This woman had had the right breast removed three years previously for a tumor which histologically was considered cancer. The axillary lymph-glands had never been disturbed and never showed any signs of involvement. It is possible the late changes in the lymph-glands, described by Ewing and quoted above, may be responsible in some instances for failure of the metastatic processes to develop in the lymph-gland. The atrophic, fibrous and fatty changes in a gland may so interfere with its function as a filter that the cancer cells fail to take lodgment in the gland. These atrophic changes in the gland may have occurred as the result of inflammatory processes in the breast prior to the development of the primary cancer growth.

Clinically, when a diagnosis of a primary carcinoma has been made we must always assume the involvement of lymph-glands even if there is no gross manifestation of the fact; our modern clinical operation for breast cancer is devised to meet such an hypothesis.

If the primary growth is extensive and advanced the lymph-nodes rarely, if ever, escape, and these are noticeable in the gross. In fact, the absence of the gross involvement of lymph-glands at operation in a case exhibiting evidence of advanced and extensive malignant disease should lead us to doubt the accuracy of our diagnosis. The following occurring in my series of stomach cases may be cited in illustration:

Mr. H., aged fifty, a farmer, had suffered for nearly a year from digestive disturbance. He had lost weight. The analysis of stomach

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contents showed the presence of lactic acid and of the Opler-Boas bacillus; there was an absence of free hydrochloric acid. Examination by the X-ray after a barium meal demonstrated a large tumor, occupying the body and fundus of the stomach with a huge filling defect, showing a very narrow channel four or five inches long through the growth. The case seemed inoperable, but at the patient's earnest solicitation I opened the abdomen and found a large mass occupying the fundus of the stomach and the cardiac portion of the body. I considered it advanced malignant disease, but I noted in my clinical records the fact that there were no enlarged glands to be found and no evidence of secondary deposits elsewhere. The abdomen was closed and the condition of the patient considered hopeless. Two years and a half subsequently I received a letter from a doctor in the West informing me that my patient was enjoying excellent health; he had put on weight and was in charge of a large stock of cattle and suffered no gastric disturbance whatever; he was applying for life insurance.

The record is significant because, while the conditions present simulated extensive malignant disease, the entire absence of metastatic development should have been sufficient to arouse our suspicions and to suggest the true diagnosis of inflammatory growth.

A passing reference may be made to the significance of the involvement of the supraclavicular lymph-glands in malignant disease of the abdominal viscera. The condition is most frequently observed in cases of cancer of the body of the stomach with secondary deposit in the lymphatic glands at the root of the neck on the left side. The explanation formerly suggested was that the lymphatic channels along the œsophagus conveyed the cancer cells from the stomach to the glands which were invaded in the neck. Later, it became evident that other abdominal organs, when the seat of cancer, showed metastases in the supraclavicular glands. This was notably the case in the uterus, the adrenals, the testis and the prostate. The correct explanation of these phenomena is that the thoracic duct is the channel of invasion and that, by a retrograde course from the thoracic duct at the root of the neck, we have implication of the lymph-glands in metastatic growth. Troisier first drew attention to these facts in 1886. The glands in the right supraclavicular region have been involved in some cases. I have several cases in my series showing this phenomenon in gastric cancer.

Abscess Formation and Gland Metastasis.—Abscess formation in connection with the secondary manifestations of malignant disease is not uncommon; the pyogenic organisms find entrance from an ulcerating surface and such infections are usually found in connection with carcinoma affecting the mucous surfaces. In three cases recently one had to deal with abscess complicating cancer of the colon. This is not an uncommon finding. In one of these an abscess which had developed in connection with a cancer of the descending colon, penetrated the psoas fascia and, behaving like the psoas abscess of spinal caries, had induced the patient to lie with the hip-joint flexed while a mass was found in the ileo-lumbar region.

An abscess developing in connection with glandular metastasis in cancer may be the first clinical evidence of disease, and the serious nature of the case may be completely masked by it. A woman fifty years of age had enlarged cervical glands for four weeks with pain and stiffness. The temperature rose to 104° and the tissues of the neck showed marked cedema. An incision was made and a retropharyngeal abscess was opened and drained.



FIG. 2.—Woman sixty-three years of age, suffering from breast cancer metastases in ribs, humerus and bones of shoulder girdle three years and a half after radical operation on the breast.

in the neck had attained enormous size, while the primary focus was still comparatively insignificant.

Primary Carcinoma of the Appendix, Etc.—The absence of secondary metastases in so-called *primary carcinoma of the appendix* is surely significant. I have elsewhere called attention to the remarkable fact that in a large percentage of the cases reported in the literature there is a history of tuberculosis and I have placed on record the history of two cases occurring in sisters, both of whom were tuberculous. One had pulmonary phthisis and in the other the appendix, which was the seat of carcinoma, was attached to a tuberculous Fallopian tube. In my paper I referred to a case of tuberculous Fallopian tube reported by Balfour and Watson; they found definite evidence

A week subsequently a similar abscess was opened on the opposite side of the neck. Four months later a mass of dense scar tissue was dissected out from the deep tissues of the neck and histologically one was surprised to find epithelial cell nests embedded in fibrous tissue. After careful search one failed to find the primary focus of malignancy. Later, it was found she had a small malignant ulcer in the larynx below the vocal cords on the posterior portion of the cricoid cartilage. This subsequently penetrated into the pharynx, dyspnoea developed, and the patient eventually died of septic pneumonia. Before death the tumors

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of tubercle in one portion of the tube and in another portion the authors show a histological picture indistinguishable from carcinoma. From a study of these cases one is justified in concluding that primary carcinoma of the appendix is in some way connected with the development of tuberculosis, and in fact may be wholly a manifestation of that pathological process.

In cancer of the rectum and rectosigmoid it is not unusual to find secondary metastases in the lymph-glands and in the liver. This fact prompts one to enter a protest against the performance of a radical operation for the removal of a cancer of the rectum or even the performance of a colostomy without first opening the abdomen in the middle line for the purpose of estimating with accuracy the extent of the primary disease and the presence or absence of metastases within the abdomen.

One of the vagaries of secondary tumors is found in patients in whom a single lymph-gland becomes the seat of a metastatic growth without any tendency for the involvement of other nodes in the neighborhood. Thus in a man of forty-nine a carcinoma of the naso-pharynx was removed. Two years subsequently I removed a single gland, in bulk the size of a large walnut, from the neck, situated under the sterno-mastoid muscle just below the level of the angle of the jaw. This was undoubtedly malignant, showing many mitotic figures under the microscope, but the character of the cell structure was such that we consider it a malignant endothelioma. The man died three years and ten months afterwards with recurrence of the primary growth in the naso-pharynx, extending into the base of the skull and causing pressure symptoms at the base of the brain. There never was the slightest recurrence in the neck, although the patient lived nearly four years after the removal of the solitary gland.

The relationship between Hodgkin's disease and lymphosarcoma is very



FIG. 3.—Woman sixty-three years of age, suffering from breast cancer metastases in both femora and in bones of pelvic girdle three years and a half after radical operation on the breast.

intimate. In the acute manifestations of Hodgkin's disease the histological picture of a gland removed for diagnostic purposes is one of a malignant lymphosarcoma. Moreover, we sometimes find these metastasizing. I have in my records a case of lymphosarcoma of the axilla with metastases in the thyroid gland; a similar case is recorded by Osler.

Implantation Carcinoma.—Implantation of carcinoma upon serous surfaces occurs with great frequency, especially within the serous sac of the peritoneum. An instructive case was in a man sixty-three years of age, in a low state of nutrition and suffering from a cancer of the pylorus. At operation one found the growth was freely movable; there were no metastatic manifestations. I performed gastro-enterostomy and determined to postpone pylorotomy until a later period on account of the miserable condition of the patient. The patient's condition improved but he had a cough, and the second part of the operation was, on that account, postponed, so that it was not undertaken until an interval of three weeks and a day had elapsed. On opening the abdomen the second time one found the pyloric growth had penetrated the serosa and secondary deposits had occurred by implantation in the adjacent omentum and in the liver. The patient died two and a half months subsequently. The record of such a case is an argument against the two-stage operation for similar conditions. We believe, if the condition of the patient warrants it, the entire surgical procedure should be undertaken in one stage.

The following case suggests the implantation of cancer by the auto-inoculation of ascitic fluid in a woman who suffered from general abdominal carcinomatosis.

This woman was fifty-one years of age and her clinical history extended over a period of three years. The trouble began in the pelvis, probably a malignant tumor of the ovary. Towards the latter part of her illness she suffered much distress from the accumulation of large quantities of ascitic fluid requiring frequent aspiration. About this time Hodenpyl (1910) had suggested the value of ascitic fluid in certain cancerous patients in the control of the course of cancer in other individuals. I was tempted to try the effect of submammary injection of the fluid in this patient upon herself. Some twelve to fifteen injections were made. I failed to obtain any beneficial result, but a tumor appeared in her right breast with enlargement of the axillary glands. This was apparently an implantation carcinoma. She died six months subsequently.

General abdominal carcinomatosis is all too familiar and does not require detailed description in this paper. The condition is apparently of the type of an implantation carcinoma and frequently, though by no means solely, has its origin in a malignant papilloma of the ovary, which has broken through the serous covering and has become disseminated throughout the peritoneal cavity. The omentum is invariably involved in these cases, but there appears to be no limit in the degree of dissemination, so that in many instances no organ within the abdomen, possessing a serous covering, escapes.

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Nodules of various sizes are found in all directions, and there is, as a rule, a large accumulation of ascitic fluid.

It is a remarkable circumstance that many of these patients live for long periods after extensive dissemination has occurred. There is apparently a high degree of resistance established. Their nutrition is maintained in spite of extensive disease. It was this circumstance which led Hodenpyl to believe that he could raise the resistance of patients suffering from cancer by inoculating them with ascitic fluid removed from a patient suffering from general abdominal carcinomatosis. The results unfortunately were disappointing. I have the record of one patient who lived four years and five months after she was found to have inoperable cancer in the pelvis. Large quantities of fluid were drawn off from time to time. Towards the latter part of her illness she had one grain of morphia every two hours. Another of my patients, fifty-three years of age, who lived for four years after the development of extensive metastases, also took large doses of morphia, taking as much as five grains hypodermically in one dose towards the latter part of her life. One is inclined to suggest that possibly morphia has some influence in maintaining nutrition and prolonging life in these cases.

The implantation and dissemination of cancer during our operative procedure is a danger which must be guarded against in our operative technic. This danger exists, for example, in our operations for breast cancer. It is a very real danger in the manipulation of the cancerous breast prior to operation or in the method of scrubbing and preparing the parts to secure an aseptic field. There is a strong argument here also against the employment of the "quick section" for diagnostic purposes at the time of operation. The writer has long held these views and has insisted upon the greatest gentleness in manipulating a cancerous breast both before and during operation. Dr. Leila Charlton Knox has recently published a paper on "The Relationship of Massage to Metastasis in Malignant Tumors." She carried out numerous experiments in mice; for example, in one series the animals were inoculated subcu-

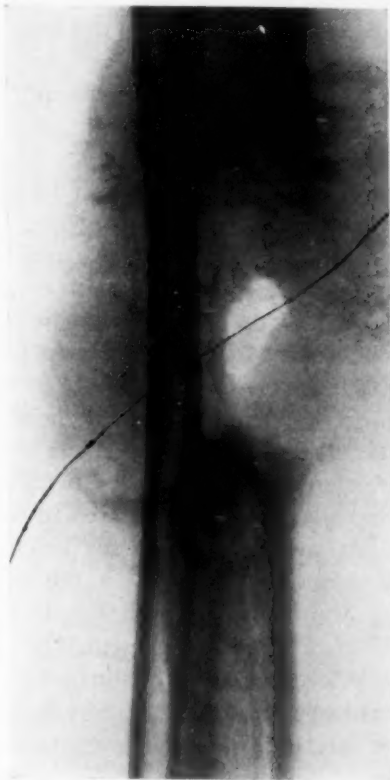


FIG. 4.—Woman fifty-three years of age, suffering from adenocarcinoma of the uterus; metastases in tibia causing complete destruction of three inches of the entire thickness of the shaft of the bone.

taneously in the inguinal or axillary region with mouse carcinoma, the resulting tumor when it reached the size of 5 mm. in diameter was vigorously massaged for one minute on two consecutive days, the tumors were then excised and the animals killed twenty-seven days later; in a large percentage of the cases metastases were found in the lungs. In another series of experiments very gentle massage, carried out every day for a fortnight, with similar findings. Experiments of this nature are instructive and suggestive, the results obtained are quite in harmony with our knowledge of the dissemination of cancer in man.

Dissemination Through the Blood Stream.—The dissemination of malignant tumors may occur through the blood stream. This is characteristic of sarcoma, while carcinomata, on the other hand, are mainly spread through the lymphatic vessels. This is probably due to the fact that the sarcomata are more closely associated with the blood-vessels both in their intimate histological structure and in their immediate surroundings than the carcinomata. We are all familiar with the tragic rapidity with which malignant sarcomas of bone metastasize in the lungs; so constantly does this occur we are compelled to take the most gloomy view in prognosis and are almost forced to conclude that removal of the limb at a point far above the primary growth is of no avail. Spontaneous fracture at the seat of growth would tend to hasten the process. In my series I have several other types of sarcoma showing metastasis in the lungs. Thus in a man of forty-two years of age, whose limb was amputated for a sarcoma developing in the muscles of the calf of the leg. Secondary growth appeared in the lungs six months subsequently. The sarcoma which occurs in the kidney in young children shows a similar fatal tendency to metastasize in the lungs.

Many tumors, both simple and malignant, invade the blood-vessels by direct continuity of growth. Of the former certain enchondromata are characteristic examples. The tumor first described by Gratzwitz, the hypernephroma, has excited much interest in the study of its etiology; it is of interest further in the remarkable tendency to metastasize widely. Bone metastasis is not uncommon, and I have recently had the opportunity of examining a secondary hypernephroma in the brain. Chorionepithelioma is so intimately connected with the uterine blood sinuses we are not surprised to find how widely and persistently it leads to metastatic growths through the blood stream.

Bone Metastasis.—One of the most interesting phenomena in the course of malignant disease is the occurrence of metastases in bone. The bone may be invaded by direct spread from the primary growth. In breast cancer, for example, we may have involvement of the ribs and sternum. According to Sampson Handley more distant bones may be reached (humerus, spine, etc.) by direct extension through lymphatic channels; one of his arguments in this connection is the immunity of the bones below the elbow and below the knee, such cases being too distant for lymphatic connection. On the other hand, he traces lymphatics to the deltoid insertion of the humerus, and to the trochanter of the femur as the most likely points of entrance for these bones.

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Schmorl, on the other hand, considers the pathway to be by the blood stream.

Bone metastasis in cancer is much more common than was hitherto believed. Von Recklinghausen made a careful study of cancer growth in bone in 1891. Sir Henry Thompson, as early as 1854, reported a case of carcinoma of the prostate with metastasis in the spine. Schmorl of Dresden, was one of the first to remark upon the very great frequency of its occurrence. According to this authority the metastatic growth may only be discovered by microscopic examination, but in the vast majority of cases it is distinguishable in the gross. Schmorl finds that of all cases of cancer coming to autopsy no less than thirty-four per cent. show metastases in bone. In late years the X-ray has proved of great value in determining the diagnosis, and has demonstrated the frequency of its occurrence.

I have a number of cases in my series of which, I may cite a few examples. There were two cases of mammary cancer in which metastases occurred in the cranial diploë. A comparatively common locality was the cancellous bone of the body of the vertebra. Others were in the bones of the extremities.

A somewhat remarkable case was in a woman of fifty-three years of age, who had an enlargement of the right tibia for seven months, when she tripped on a mat and probably fractured the bone at that time, as she was unable to put her weight upon the limb subsequently. Nine months afterwards her medical adviser incised the "swelling," from which came blood and serum. It was then assiduously poulticed with linseed. This woman first came under my care twenty-one months after the first appearance of trouble in the leg. One found a fusiform tumor and the X-ray picture showed complete destruction of three inches of the entire thickness of the shaft in the middle third of the tibia (Fig. 4); amputation was performed at the knee-joint; histologically the growth proved to be carcinoma. A careful search was made for a primary growth—breast, abdomen, pelvis, etc.,—but without success, and the patient left hospital and we lost sight of her. Eight months subsequently she returned to hospital when we discovered an adenocarcinoma of the uterus with extension to the bladder. The condition was inoperable. She was treated by X-ray but, although there was definite recession of the disease for a time, she died two years subsequently.

This patient therefore had the remarkable history of a secondary carcinoma of the tibia which existed two years and five months before the primary cancer of the uterus was discovered. Furthermore, she lived for four years and five months after the first appearance of the disease.

As an example of metastasis in the spine, I might mention the following case with a somewhat unusual history:

A woman of thirty-nine had her right breast removed three years before she came under my observation. The nature of the trouble in the breast at that time was somewhat doubtful; it was supposed to be "chronic mastitis," but the report of the pathologist suggested probable malignancy. The axillary glands were not removed. A year and a half subsequently she complained of abdominal pain and pain in her back.

As the result of the findings in an X-ray series after a barium meal her appendix was removed. She insisted, however, that her "back was broken," and in truth she was right. Three years after the removal of the breast a stereoscopic picture obtained by the X-ray showed an almost complete destruction of the body of the fourth lumbar vertebra, with less extensive involvement of the twelfth dorsal, the fifth lumbar and the upper part of the sacrum. It was a purely destructive process with no new bone formation and without any invasion of the intervertebral discs which remained intact.

This patient therefore showed metastasis in the spine three years after the removal of a breast carcinoma and the remarkable fact remains that the axillary lymph-nodes were never involved and were not removed.

One of my patients exhibited multiple bone metastases at widely separated parts of the skeleton.

A woman, sixty-three years of age, was operated upon for cancer of the breast with two subsequent operations, during the next three years, for recurrence in the axillary glands. Three years and a half after the first operation she was treated by an osteopath for "rheumatism" of the right hip. She had lost weight. Shortly after this she came to hospital, when we discovered metastases in the upper part of each femur, the ribs, the humerus, and in the cranial diploë (Figs. 1, 2, and 3). This woman is still living, five and a half years after the breast was amputated and two years since the multiple secondary growths in the bone were discovered. She now has a large mass of recurrent growth in the axillary glands.

The course of events in the bone at the seat of a secondary carcinoma are of interest. Bone is destroyed at the seat of the growth and spontaneous fracture of a long bone may occur. In this event, under suitable conditions of rest and splinting, callus may be formed and union may occur. In other instances destruction of the entire thickness of a bone may involve a considerable portion of a shaft and union becomes impossible. The tumors are frequently multiple. A study of these cases would lead one to assume that in many cases a secondary growth of cancer in bone remains more or less dormant for long periods of time. The tumors do not, as a rule, grow to great size; they are confined within the bone and do not tend to invade the soft structures beyond. In time, however, the surrounding tissues may be infiltrated and increased rapidity of growth ensues.

Metastatic tumors in bone may be present without being suspected by either the patient or her medical attendant; in many instances their existence has only been discovered accidentally. The complaint of pain in various parts of the skeleton, particularly in the spine in patients suffering from cancer, arouses suspicion, and an investigation by the X-ray should be undertaken. Treatment of these cases by the radiologist may possibly be of some service. It is impossible to make any definite statement in this regard, but certain cases would appear to be relieved of pain and to improve in general health under this treatment.

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RECURRENCE VERSUS METASTASIS IN CARCINOMA*

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THE term "recurrence," after the excision of a carcinoma, is ordinarily used to indicate its return or reappearance resulting from the gradual growth of a focus of tumor tissue, which, owing to its minute size, escaped detection, and therefore removal, at the time of operation. In this paper the writer has been obliged to select the same term to indicate the independent development of a second carcinoma without any etiological relation whatever to the original growth which, presumably, was completely and successfully removed. The term recurrence, used in the latter sense, therefore, implies a fresh outbreak of the lesion at a time so distant and in an organ so remote from that originally involved that no distinct etiological relationship can be traced. Recurrences of this type, however, do not constitute the sole evidence which may be cited in favor of the independent development of two carcinomatous foci. Of equal importance at least is, first, the evidence supplied by cases of the simultaneous or nearly simultaneous development of carcinoma in different parts of the same organ or in entirely separate organs; secondly, instances of isolated recurrence in a distant organ without discoverable metastasis in any other part of the body, in which cures are effected by a secondary operation.

While strong clinical evidence can be cited in an endeavor to establish the fact that carcinomatous growths may thus develop simultaneously or consecutively and yet independently, that they are not unusual or rare manifestations of a common malignant process can not actually be proved, especially in view of the complete mystery in which the actual cause of carcinoma is at present invested. At least the clinical features of the cases herewith briefly reported differ widely from the corresponding features of carcinomatous metastasis, either through the lymphatic system in which metastasis ordinarily follows a standardized course, or through the much less frequent blood current in which the location of metastases, for obvious reasons, may vary widely.

Clinical evidence pointing to the possibility of the independent development of multiple carcinomatous foci is presented by a study of carcinoma of the breast. The following instance illustrates the development of two carcinomatous foci of about the same size and presenting identical physical signs, yet separated by a considerable interval of normal glandular tissue.

CASE I.—Female, thirty-nine. An aunt had "tumor of the breast." Six weeks before its removal a growth about the size of a small hen's egg was found in the lower outer quadrant and a similar, though

* Read before The American Surgical Association, Washington, D. C., May, 1922.

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somewhat smaller growth, that had not been noticed by the patient, was found in the upper inner quadrant of the left breast. The right breast was normal. Examination of the left breast and axilla, after operation, showed typical carcinoma of both nodules without axillary involvement. Two months after operation the patient died of some unknown acute infectious disease, after a short illness.

Instances of the simultaneous development of carcinoma in both breasts have been observed, although no case of this character has been treated by the writer. It is a rare condition.

Instances in which after radical removal of a carcinoma of the breast, carcinoma appears in the opposite breast without discoverable metastasis in any other part of the body. The following instance illustrates this type of mammary carcinoma.

CASE II.—Female, fifty-four. Removal of a small carcinoma of about six months' standing and without axillary involvement. No lump was found in the opposite breast until eighteen months after the primary operation. A similar growth then appeared, also without axillary involvement, and was removed in the same thorough way. Twelve years after the second operation the patient, free from recurrence, was in excellent health.

This case is worthy of comment in that, were the carcinoma of the remaining breast the result of lymphatic extension, it is scarcely conceivable that the intervening glands, either without or within the chest cavity, would have remained free from carcinomatous invasion. As a matter of fact, such "intervening involvement" is usually observed in cases in which carcinoma in the remaining breast is a part of an inoperable metastasis. Theoretically the condition, herewith reported, could be accounted for by the development of a vascular metastasis, a highly improbable explanation. To regard this case, therefore, as an example of the independent development of carcinoma in widely separated organs, seems reasonable.

The following case illustrates the development at or about the same time of carcinoma in widely separated parts of the body.

CASE III.—In May, 1919, a carcinoma of the breast of uncertain duration but with such extensive axillary involvement as to render recurrence almost inevitable, was removed in a patient of forty-five. Twenty-five months later, after a history of increasing constipation for the previous six months, an enterostomy was performed for what proved to be an inoperable carcinoma of the sigmoid, the patient surviving the operation for ten months.

Which growth in this case was primary must remain uncertain. The far advanced condition of the carcinoma of the sigmoid, however, indicated a duration of at least several years and seemed to render possible a simultaneous independent development of both carcinomata. At least carcinoma

of the large intestine as a metastatic manifestation of carcinoma of the breast or vice versa is rarely observed.

A further study of carcinoma of the large intestine provides certain evidence of the multiplicity or independent development of the lesion. The writer recalls a specimen of a carcinoma of the rectum shown by Professor Hochenegg in Wien to the members of the Clinical Surgical Society in 1912, in which there were two distinct foci, separated by at least three inches of normal mucous membrane. In this instance the lower growth might have been the result of contamination from the discharge of the upper, except for the fact that by reason of its size and the extent of the involvement of the rectal wall, the lower growth was the older of the two.

CASE IV.—In 1917 resection of a considerable portion of the sigmoid for an adenocarcinoma involving the entire thickness of the visceral wall with beginning lymphatic involvement in the adjacent mesentery. End-to-end anastomosis. Nearly three and one-half years later resection of the splenic flexure for the relief of an attack of subacute obstruction the result of an adenocarcinoma at that point. Owing to the enormous dilatation of the cæcum, which completely filled the pelvis, no anastomosis could be done and the patient, one and one-half years later, is free from recurrence with an artificial anus. Examination of the resected sigmoid at the time of the second operation showed the anastomosis to be in excellent condition.

The lesion in this instance is somewhat analogous to the lesion described in Case II in which the second breast was removed for carcinoma eighteen months after a similar operation on the opposite side, with the difference that sufficient time has not elapsed to determine whether the patient will remain free from further recurrence. Moreover, the involvement of the splenic flexure after the sigmoid eliminates the possibility of dependence of the former growth upon some form of irritation of the primary lesion, excepting, of course, possible contamination from reversed peristalsis.

CASE V.—Seventeen years after excision of a carcinoma of the breast without axillary involvement, examination after an attack of alleged hemorrhoids revealed a carcinoma of the sphincteric portion of the rectum. This was removed by the usual form of Kraske's operation. The patient, over seventy, died several years later from natural causes without sign of recurrence.

This case illustrates the development of a secondary carcinoma, which, both in view of the remoteness of its location as well as in the unusually long period elapsing since the removal of the original growth, probably had no distinct etiological relationship with the primary lesion.

CASE VI.—Twenty-two years after the radical removal of a carcinoma of the left breast without axillary involvement, inoperable multiple carcinomata developed in the abdomen, the liver especially being

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involved. Patient died within six months, without any indication of thoracic involvement. Unfortunately no autopsy could be obtained.

This case is of interest, irrespective of all speculation as to the possibility of a fresh outbreak of the lesion in the abdominal cavity in emphasizing the fact that no interval of years elapsing after an operation for carcinoma without visible recurrence, can be adopted as a standard of positive cure. At first three years was considered a sufficient interval for such a standard, then five years. This, however, is much too short, and no patient should be discharged from observation no matter how many years may have elapsed since the original operation.

Careful consideration of the clinical features of the cases herewith reported fails to disclose any positive etiological relationship between the primary growth and those that developed secondarily. That carcinoma shares with many varieties of benign tumors the clinical manifestation of independent multiplicity cannot be advanced. There is no reason, however, why more than one glandular organ should not be exposed to the exciting cause of carcinoma, whatever that may be, either at about the same time or many years after the successful removal of the initial growth. This is certainly true of persistent and long-continued mechanical or other form of irritation which is recognized as the most important predisposing etiological factor in this justly dreaded lesion.

If, for the sake of argument, the possibility of the independent development of two or more carcinomatous foci is granted, the wisdom of the thorough excision of each focus cannot be gainsaid. While metastasis ordinarily contra-indicates surgical interference, analysis of the majority of cases herewith cited leads to the conclusion that a wide excision of carcinomatous foci without evident interdependence yields encouraging results, and the propriety of adopting such a surgical principle will, I believe, be concurred in by all.

THE TREATMENT OF CANCER OF THE JAWS*

OBSERVATIONS CONTINUED SINCE 1918, COVERING 26 ADDITIONAL CASES

By ALBERT J. OCHSNER, M.D.

OF CHICAGO

At the meeting of this society four years ago, I reported my clinical observations concerning malignant tumors of the jaws operated since 1901 at the Augustana Hospital. One hundred cases in all.

Since that time I have added twenty-six cases to my series, in all of which the tumor has been removed by means of the actual cautery, and in addition to this treatment, all of the cases have been treated intensively with X-ray.

A number of these cases were so far advanced that I should not have undertaken operative treatment except for the fact that since the administration of massive doses of X-ray through thick fillers, a few apparently absolutely hopeless cases of cancer in various parts of the body have made remarkable recoveries. In the meantime, however, I have been consulted by a considerable number of cases that were absolutely beyond hope. These were not operated upon but referred for palliative treatment to the X-ray department, and these are not included in this series. All of these absolutely inoperable cases had been previously operated elsewhere.

Twenty of these patients operated since the last report was made ranged from fifty-one to seventy-five years of age. Six were less than fifty years old.

The youngest patient three years old, and the next nine, suffered from spindle-celled sarcoma of the upper jaw.

The third and fourth, each twenty-one years of age, suffered from epulis of the upper jaw.

The fifth, twenty-eight years of age, suffered from carcinoma of the lower jaw, involving also the parotid gland.

The sixth case, forty-four years old, suffered from sarcoma of the upper jaw, involving the antrum.

There were four deaths in this series of twenty-six cases. Two, fifty-seven and sixty-three years old, respectively, suffered from carcinoma of the lower jaw, involving the lymphatics of the neck. In these an extensive dissection of the neck was made with the cautery, extending from the jaw down to the clavicle. Death occurred on the sixth and seventh days, respectively, from hemorrhage. In one the common carotid artery had been ligated during the operation.

A third case, a man sixty-six years of age, suffering from a carcinoma of the upper jaw, involving the antrum, died on the eighth day after the operation from hemorrhage.

* Read before the American Surgical Association, May 1, 1922.

TREATMENT OF CANCER OF THE JAWS

TABLES

TABLE I.—PATHOLOGY

	Cases	Per cent.
Carcinoma	83	65.9
Epulis	20	15.8
Sarcoma	21	16.3
Leucoplakia	1	.8
Odontoblastoma	1	.8

TABLE II.—LOCATION

	Carcinoma		Sarcoma	
	Cases	Per cent.	Cases	Per cent.
Inferior maxilla	57	45.2	6	4.8
Superior maxilla	31	24.6	8	6.3
Maxillary sinus	7	5.5	2	1.6
Cheek	6	4.8	1	.8
Parotid gland	3	2.4	3	2.2
Palate	1	.8	1	.8

TABLE III.—SEX

	Carcinoma		Sarcoma		All cases	
	Cases	Per cent.	Cases	Per cent.	Cases	Per cent.
Male	71	56.4	18	14.4	89	70.6
Female	18	14.4	19	15.1	37	29.4

TABLE IV.—DURATION OF SYMPTOMS BEFORE TREATMENT

	Cases	Per cent.
1 to 3 months	29	23.1
3 to 6 months	29	23.1
6 to 12 months	29	23.1
1 to 2 years	37	29.4
2 to 5 years	2	1.6
	126	

TABLE V.—OPERATIVE DEATHS

	Cases	Per cent.
First day	3	2.4
2 to 5 days	5	4.0
5 to 20 days	8	6.3
20 to 40 days	3	2.4
After 40 days	5	4.0
Total deaths	24	19.1

ALBERT J. OCHSNER

TABLE VI.

Case No.	Age	Sex	Occupation	Location	Etiology	Duration	Lymph Glands Involved	Previous Treatment
67804	77	F.	.....	Lower lip and jaw	Unknown	3 mos.	Yes	None
64820	65	M.	Egg inspect.	Cheek and lower jaw	Smoker canker sore	1½ yrs.	Yes	None
54355	56	M.	Machinist	Lower jaw	Tobac. chewer. Pyorrhoæa	8 mos.	No	None
59892	70	M.	.....	Parotid gland. Lower jaw	Tooth irritation	5 yrs.	No	9 operations
61198	60	M.	Farmer	Upper max.	Carious teeth. Bit cheek	6 weeks	No	Teeth extract.
68691	52	F.	Dentist	Left antrum	Unknown	5 mos.	No	Caut.-Rad.-X-ray
59294	28	F.	Housewife	Parotid gland and lower jaw	Erysipelas of cheek	13 mos.	Yes	2 knife ops.
57253	52	M.	Miner	Lower jaw	Epith. lip; recurrent	7 yrs.	Yes	V-shaped incis. lip.
66911	68	F.	Housewife	Lower jaw and cheek	Carious teeth	1 yr.	Yes	2 previous ops. X-ray and radium
62771	53	M.	Carpenter	Lower jaw and face	Cold sore on lip	16 yrs.	No	Resect. upper jaw
68268	54	M.	.....	Lower jaw and lip	Epith. lower lip	9 mos.	Yes	V-shaped incis. X-ray and radium 9 mos. ago
68508	66	M.	Clerk	Carci. upper jaw and antrum	Carious teeth	6 mos.	No	Incis. abscess
65335	21	F.	Housework	Lower jaw	After teeth removed	3½ yrs.	No	Teeth removed
65937	44	F.	Housework	Antrum	Unknown	6 mos.	No	None
61608	21	F.	Teacher	Upper jaw	Unknown	2 yrs.	No	None
55328	62	M.	Farmer	Lower jaw	Not known	3 mos.	No	Cautery
66275	62	M.	Farmer	Upper jaw	Pyorrhœal. Extr. teeth	1 yr. 2 mos.	No	None
61307	53	F.	Housework	Upper jaw and nose	Epith. nasal angle	8 yrs.	Yes	X-ray and paste
68612	9	M.	Schoolboy	Lower jaw	Tooth extr. July, 1921	7 mos.	No	Teeth extr.
57204	75	F.	Housework	Lower jaw	Teeth extr. June, 1918	6 mos.	Yes	X-rays
63661	3	M.	.....	Upper jaw	Not known	4 weeks	No	None
66697	64	M.	Farmer	Lower jaw and parotid	Not known	1 yr.	No	Cautery
57842	67	M.	.....	Upper jaw and parotid	Not known	8 mos.	No?	Cautery
61091	51	M.	Laborer	Upper jaw and cheek	Not known	5 yrs.	No	None
59325	57	M.	Salesman	Lower jaw	Pyorrh. and infect. teeth	12 yrs.	Yes	X-ray and extract. teeth
67031	63	M.	Carpenter	Lower jaw	Infected teeth. Chews tobacco	2 yrs.	No	None

TREATMENT OF CANCER OF THE JAWS

TABLE VI.

Treatment	Date Op.	Date Re-op.	Result	Cause of Death	Time of Death after Operation	Diagnosis	Remarks
Cautery excision	8-26-21	.....	Recov.	.....	.....	Epithelioma of lower jaw	Started in lower lip
Cautery ex. Teeth ex.	11-17-20	.....	Recov.	.....	.....	Carcinoma lower jaw	Started in lower lip
Cautery irons	4-24-18	.....	Recov.	.....	.....	Carcinoma lower jaw	
Cautery irons	8-28-19	.....	Recur.	.....	.....	Carcinoma parotid and jaw	9 previous operations
Ex. rt. max with caut.	12-27-19	.....	Recov.	.....	.....	Odontoblastoma max.	Started from biting cheek
Cautery irons	11-23-21	.....	Died	Cerebral embolus	2 days	Sarcoma	Recurrent case
Electric caut. and irons	7-9-19	.....	Recov.	.....	.....	Carcinoma parotid and jaw	
Electric caut. and irons	1-17-19	7-9-19	Recov.	.....	.....	Carcinoma lower jaw	Result of V-excis of lip
Electric caut. and irons	6-6-21	.....	Impr.	.....	.....	Carcinoma lower jaw	
Electric caut. and irons	5-17-20	.....	Rec.	.....	.....	Spindle-cell sarcoma	Recur. in lower jaw following sarcoma. Excision of upper jaw
Electric caut. and irons	10-8-21	.....	Impr.	.....	.....	Squam.—cell carc. of lower jaw	Result V-shaped excis.
Cautery incis. Sup. max.	11-3-21	.....	Died	Hemorrhage	8 days	Carcinoma antrum	
Cauterization and removal of teeth	1-10-21	.....	Rec.	.....	.....	Epulis	
Excis. max. with cautery irons	3-4-21	Recur. 6-24-21	Impr.	.....	.....	Sarcoma	Recurrence
Excision with cautery, ext. teeth	12-31-19	.....	Rec.	.....	.....	Epulis	
Cautery	7-25-18	.....	Rec.	.....	.....	Carcinoma	Recurrence
Cautery	4-7-21	X-ray 11-30-21	Rec.	.....	.....	Carcinoma	Several recurrences cauterized
Actual cautery, radium	2-4-20	.....	Impr.	.....	.....	Carcinoma	Stimulated by caustic paste
Actual caut. excis.	11-13-21	1-24-22	Rec.	.....	.....	Spindle cell sarcoma	3 mos. later all well. Plastic done
Actual caut. excis.	1-13-19	9-13-19	Recurrence	.....	.....	Carcinoma	Rapid recurrence
Actual caut. excis.	5-6-20	7-29-20	Recurrence	.....	.....	Epulis, upper	Became spindle-cell sarc. and recurrence
Actual caut. excis.	7-9-20	.....	Rec.	.....	.....	Carcinoma	Well after 2 yrs.
Actual caut. excis.	3-10-19	.....	Rec.	.....	.....	Epithelioma	
Actual caut. excis.	12-10-19	.....	Rec.	.....	.....	Leucoplokia	
Bloe dissect of neck cautery excis.	7-11-19	.....	Died	Hemorrhage	7 days	Epulis, malign	
Ligation common carotid artery.	12-27-18	.....	Died	Hemorrhage	6 days	Carcinoma	

A fourth patient, fifty-two years of age, with the same condition, died suddenly on the second day after the operation from cerebral embolus. All of these cases were so far advanced that there was very little hope of a permanent recovery, and in all of them the operation was very extensive and they all knew that they were taking a desperate chance, which they were all willing to take. Judging from their desperate condition, it seems that they made a wise choice.

This series contains nine females and seventeen males, or nearly twice as many males as females.

The upper jaw was involved eleven times, the lower fifteen times.

In four cases the tumor had developed from an epulis.

In four cases the tumor was a sarcoma.

In sixteen the tumor was a carcinoma.

In none of these cases could metastases be demonstrated at the time of operation in different parts of the body, which made it seem worth while to make an effort to destroy the entire growth in the jaw and in the cervical lymph-nodes with the cautery because it seemed that the thorough destruction of these areas would give the patient some chance of a permanent recovery.

So much progress has been made in the use of X-ray and radium that the next few years may develop marked changes in the treatment of these cases.

At the present time the destruction of these growths with the actual cautery, or with one of the methods of applying diathermy, seems to give better chances of a permanent cure than excision with the knife.

All of these cases were operated in the inverted Trendelenburg position with the head of the table raised to an angle of 45 degrees.

They were under very complete morphine, atropine, ether anæsthesia administered with the patient in the horizontal position, but no ether was administered after the operation was begun nor after the head of the table had been elevated.

The cerebral anæmia caused by the position seemed to suffice to carry the patient through the operation without the necessity of administering any further anæsthetic. There were no other pneumonias.

In these cases our observation in the previous series of cases has again been confirmed that cases that have a recurrence following an incomplete operation have but a very slight chance for a permanent recovery. This shows the importance of making a very thorough operation at the time when such tumors are first noticed.

We are collecting reports concerning deaths occurring since these patients left the hospital and the condition of those who are still alive, but belated reports are still coming in so this table will be added later.

Our observation has convinced us that early and very extensive operation with the cautery, followed by carefully planned after-treatment with X-ray or radium, is quite worth while in these cases and that occasionally even advanced cases will be permanently cured by this method.

The appended table gives details concerning this series of twenty-six cases.

CARCINOMA OF THE THORACIC OESOPHAGUS

FINAL NOTES AND POST-MORTEM EXAMINATION IN THE CASE REPORTED
IN THE ANNALS OF SURGERY, SEPTEMBER, 1921

By HOWARD LILIENTHAL, M.D.

OF NEW YORK, N. Y.

AFTER the patient's discharge, apparently entirely well, early in May, 1921, there was gradual narrowing of the lumen of the mucocutaneous border of the upper segment. Although he was able to take solid food in a normal manner, he was kept under observation and bougies were passed frequently. Gradually narrowing appeared, but the patient's general condition was excellent and his weight almost or quite up to his normal.

On October 10, 1921, Doctor Yankauer performed oesophagoscopy and finding what looked like a little granulation tissue in the mucosa just above the junction with the skin, he removed a small polypoid mass and stretched the constriction with the mechanical dilator. The patient had entered the hospital for this procedure, but went home the following day. Two weeks later Doctor Yankauer again used the oesophagoscope, but this time he found, above the upper stricture, two tiny elevations, both of which were removed. One proved to be polypoid and the other, unfortunately, a minute carcinoma.

The patient entered the hospital on November 14 and I operated, using general anaesthesia. I dissected up the two skin flaps and exposed the underlying cicatricial tissue, so as to produce as nearly as possible the appearances at the time of the original operation. Without the advantage of landmarks, merely by sense of direction, the dissection was continued, and I came upon the pleura, but fortunately did not enter it. The lung could be seen moving beneath in a perfectly normal manner. I at once sutured the tissues over the exposed pleura and continuing into the depths, reached the reconstructed cutaneous oesophagus, which was easily recognized. To make sure, I punctured it with a hypodermic needle with a syringe attached and withdrew air on suction and then incised from above downward into this skin oesophagus. Its surface was pinkish-white and fine hairs were still to be seen upon it. The exposure was perfect. The lower opening had somewhat contracted, although it was sufficiently large for swallowing, but the upper opening had become reduced to the size of a fine probe, and Doctor Yankauer, who was present, doubted that he had ever entered it. I divided this stricture and stretched it to the size of my index finger. Close to the mucocutaneous border was a tiny mass which looked like a polypoid. I removed it for examination. Nothing else abnormal was seen. A stomach tube was now passed beyond the cardia through the lower opening and left there for feeding. On November 23, 1921, Dr. Burton J. Lee very kindly came to the hospital and placed 180 millicuries of radium filtered through one-half millimetre of silver and one millimetre of rubber just above the upper stricture and left it in place for three hours.

About two weeks later there was some reaction with substernal pain. Another application of radium (237 millicuries) was made about December 27, also for three hours. This was followed by severe reaction with aphonia due to left chord paresis. This aphonia at first seemed to improve, but later returned and was permanent.

On February 16, 1922, the oesophagoscope showed a few scattered suspicious areas extending for about one inch above the mucocutaneous junction, and

HOWARD LILIENTHAL

Doctor Yankauer later applied the electro-cautery very lightly to these points through the wound in the back, the patient going home the next day. A week later there was a sudden shock with dyspnoea and great and rapid deterioration. There was strangling on attempting to swallow even liquids. The regular feedings had been entirely through the wound in the back. On February 24 I examined the wound and saw what appeared to be the aperture into the upper segment, but on passing an instrument into it there was immediate cough and strangling, showing that it had apparently passed into a bronchus. Pneumonia finally developed, and the man died on April 26, a little more than one year and four months after his first operation.

A limited post-mortem examination was permitted and revealed a large necrotic fistula between the trachea and the oesophagus, about one inch above the upper mucocutaneous border. There was a mass of glands, not large, behind the oesophagus, about opposite the perforation. There was a single hard mass between the oesophagus and the aorta in the same region, infiltrating and binding the two structures together. The transplanted skin looked absolutely normal and the line between the mucosa and the skin was smooth, the one membrane passing into the other without a visible cicatricial break. The lungs showed pneumonia.

The general appearances of the necrosis and of the fistula suggested to my mind that the radium had been the cause of the perforation. On stating this at the meeting of the American Surgical Association in Washington at the 1922 meeting, Doctor Lee thought that the electro-cautery might have been a causative factor as well as the radium. I still believe, however, that it was a radium necrosis, and this was also the opinion of Dr. F. S. Mandlebaum, who made a microscopical examination of sections through the tissues about the fistula. Dr. James Ewing, who kindly examined the slides, writes under date of June 23, 1922, as follows:

"I have little doubt under the circumstances you relate that the lesion is mainly the result of radium necrosis. Especially the wide, diffuse, simple necrosis of tissues without much reaction seems to indicate a radium effect."

Epicritical Note: This case and others in which the first stage only was performed have taught me: First, that the operation as planned is feasible. Second, that in order to succeed the patient must present himself while the disease is still localized within the oesophagus. Third, that much wider resection of the oesophagus should be made than would appear necessary judging by the extent of the visible lesion.

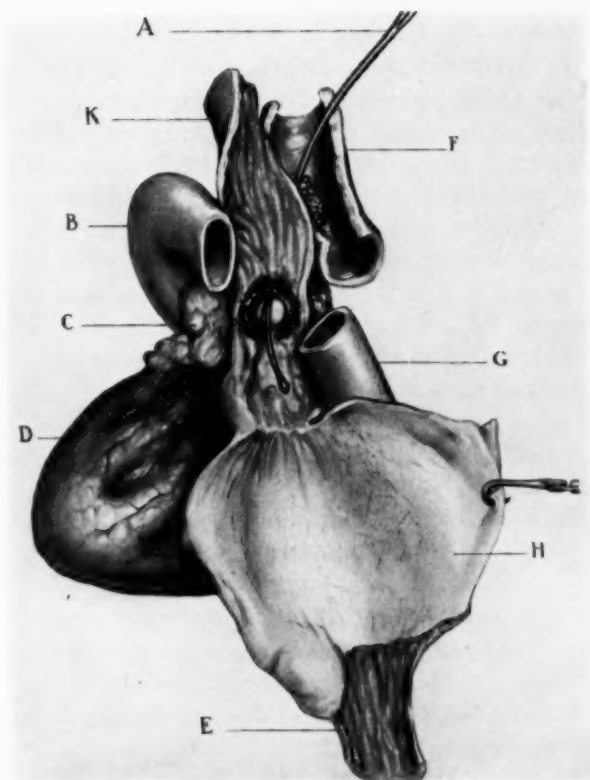


FIG. 1.—Post-mortem specimen. Posterior view. Note the sharp line of demarcation between skin and mucous membrane of œsophagus both above and below. There was a tendency to contract in the upper end (see wrinkles denoting puckering); no such tendency below. A, probe passing through fistula between trachea and œsophagus. B, arch of aorta. C, carcinomatous mass. D, heart. E, lower portion of œsophagus. F, trachea laid open showing carcinomatous deposits in the interior. G, descending aorta. H, skin tube laid open (autoplasic œsophagus). K, upper portion of œsophagus. At the bifurcation just behind the aorta where the handle of the probe crosses is a cauliflower mass, evidently carcinomatous.



THE END RESULTS OF TREATMENT IN CERTAIN FORMS OF MALIGNANCY OF THE NECK*

By MARTIN B. TINKER, M.D.

OF ITHACA, N. Y.

THE difficulties in management of most cases of malignancy in the neck, far enough advanced so that a probable diagnosis can be made before operation, are so great that the average surgeon could not forget his experiences if he tried and the occurrence of the various forms of malignancy about which I have sought information is so infrequent, that most surgeons would not need to consult their records to recall with reasonable accuracy the number and essential facts regarding their cases. The information given in most reference publications is meagre and of doubtful reliability, and judging from the results of investigation of thyroid malignancy the literature is a very incomplete record of surgical experience in this field. Wilson¹ was able to collect 169 cases of thyroid malignancy in personal communications from sixty-seven American surgeons, not including those in the Mayo Clinic, none of which had been reported in the literature. "That is almost five times as many cases have been met with in the experience of a very small number of American surgeons as have appeared in the entire literature from all American sources." Believing that results in the management of other forms of neck malignancy were likewise mostly unreported and that knowledge of such experience should stimulate interest and further improve results, letters of inquiry were sent to all members of this Association. Ninety-eight replies were received. Sixty surgeons do not deal with this class of cases or are unwilling to express an opinion because of incomplete records or the fact that they have not recently been in active surgical work. Data of considerable value were received from thirty-eight. While the results reported are less encouraging than the results of treatment of malignancy in many other parts of the body, they do not justify the pessimism with which these cases are still regarded by many surgeons. In times past extremely radical operations have been performed, followed by low percentage of permanent cures which have tended to bring surgery into disrepute, and cases should be carefully studied and selected. In the interest of better end-results these cases may be treated in three main groups: Those in which operation is contra-indicated; those in which operation offers reasonable prospect of cure; and those in which, while operation gives little or no hope, Röntgen-ray or radium has proved of certain value in palliation and occasional cure.

In at least two forms of malignancy I believe that operation is usually contra-indicated, namely, metastasis to the neck from tonsillar or pharyngeal growths or from growths of unknown origin. So far as I have been able to determine, no cures have been reported in case of malignancy of the tonsil

* Read before the American Surgical Association, May 1, 1922.

or pharynx with metastasis to the cervical glands, and I believe in such cases palliative treatment by Röntgen-ray or radium should be advised. Dr. E. A. Codman has reported by personal letter one recovery following treatment with radium of extensive malignancy of the jaw with metastasis. A second group of cases in which I have personally never seen a cure is malignancy of the glands of the neck, evidently metastatic, in which the original focus cannot be located.

In the group in which operation offers a fair prospect of recovery may be included the early cases of malignancy of the thyroid; malignancy originating in branchial cleft remnants; carotid-gland tumors and tumors of the parotid. Personally, I believe that the early cases of Hodgkin's disease might also be included in this group.

In the third group, which in my opinion should be treated by radium or Röntgen-ray either with or without surgery, should be included the more advanced cases of Hodgkin's disease, advanced thyroid malignancy and advanced branchial cleft carcinoma.

There is quite general agreement as to the influence of methods and technic on end-results, but it seems impossible to give definite figures.

Permanent results, as with malignancy in any part of the body, depend upon complete extirpation of all diseased tissue wide of the growth and with all lymphatic glands in nearby territory. There is quite general agreement as to the value of "block dissection" in such cases. The importance of sharp dissection as opposed to blunt dissection of any form in dealing with malignancy has been emphasized for many years by Dr. W. S. Halsted and also by Dr. G. W. Crile. Two surgeons of this Association use the electric cautery instead of the knife in excision of certain growths.

Careful dissection requires a dry field and perfect light, and the results of these operations, both immediate and permanent, have apparently been improved by obtaining control of the main arterial supply early in the operation. Twenty-seven members of this Association state that they close the great vessels in one way or another; some rarely, many generally, and sixteen use some form of temporary closure, most frequently rubber-padded forceps as suggested by Crile. The flexible metallic bands used by Doctors Halsted and Matas are also of great help in some of these cases.

As to permanent closure with vessel suture it is possible to save considerably more of the large vessels of the neck, and where, as with carotid-gland tumors and many of the cases of extensive malignancy, it is necessary to divide the common carotid in order to completely eradicate the growth, the collateral circulation is specially important and the saving of a fraction of an inch as can be done with blood-vessel suture often makes much difference in the local circulation as well as that at the base of the brain. Following Matas, many surgeons all over the world have demonstrated the reliability of suture as a means of closing the great vessels in the cure of aneurism, but apparently few have applied this principle for similar reasons to secure closure

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and saving collateral circulation in the management of malignancy. Seven surgeons report suture of the jugular for injury but none intentional suture of the arteries. I have sutured the carotids three times—twice for carotid-gland tumors and one branchial cleft malignancy—all these patients surviving the operation five years or more.

Venous oozing is very greatly diminished by putting the patients in a sitting position or tilting them in reverse Trendelenburg position with the head fairly high. We have seen no unfavorable results from either of these methods. Twenty-two members of this Association operate with the head of the table elevated while four prefer the patients flat.

Perfect definition of the tissues by real daylight or the daylight lamp greatly aids in distinguishing between certain forms of malignancy and the adjacent tissues.

The influence of anæsthesia on venous and arterial hemorrhage is very evident in neck surgery. All forms of general anæsthesia, even chloroform, give temporary rise in arterial blood-pressure and almost invariably a certain increase of carbon-dioxide in the blood with accompanying free venous ooze which in many of these cases makes perfect dissection impossible. Personally I always use local anæsthesia, although often in combination with general anæsthesia. If bleeding is troublesome removal of the general anæsthetic improves conditions very greatly. Local anæsthesia alone, in my opinion, gives much better results in certain cases, notably in parotid-gland tumors, where if we work close to the capsule serious injury of the facial nerve can almost invariably be avoided. While a majority of this Association (twenty-eight) expressed preference for ether, nine use gas-oxygen, three use local anæsthesia almost to the exclusion of ether, two prefer rectal ether anæsthesia and one avoids increased bleeding from elevated blood-pressure and venous congestion by withdrawing the general anæsthetic as soon as the skin incision is made and the exposure of the deeper parts is made.

As to results in various forms of neck malignancy reported by members of this Association:

Hodgkin's Disease.—A total of 183 cases were reported, with seventeen patients remaining well five years or more following operation; seventy-five of these cases were reported by Yates and eleven of his patients have remained well from five to twelve years. In terms of the standard form of reporting end-results of the Massachusetts General Hospital this gives nine per cent. of five-year cures. Three have abandoned operating in these cases, but I believe should reconsider. In cases far advanced the disease is undoubtedly followed by recurrence and death whatever form of treatment is used, but early operation when the disease is limited to a small group of glands should, I believe, be followed by many permanent cures. Röntgen-ray gives striking improvement even in many apparently hopeless cases, and it is possible that by its use some patients might be brought into the operable class. The real facts are difficult to get at because of confusion in the pathology.

In two of my earlier cases the patients have remained well six years and seven years. When the profession comes to the point of advising radical removal of every bunch of enlarged glands of the neck of more than a few months' standing, and in which reasonably conservative measures have been thoroughly tried, our percentage of permanent cures in Hodgkin's disease should greatly improve.

Carotid-gland Tumors.—Total number reported, twelve. These are probably mostly previously unreported cases. Operative mortality one, five-year cures 5, or a percentage of 41.6. The results of operation for tumors of the carotid body have been studied in this country first by Keen, by Randolph Winslow in a paper before this Association, by Lund, Mont Ried and many others. My experience in operation upon three patients corresponds with that of Winslow; that removal of the growth with the arteries gives a good prospect of permanent cure, but dissection from the vessels is more frequently followed by recurrence. Radical removal of the growth with permanent closure of the arteries above and below gave a cure of five years' duration in one of my cases and seven years in the second case, while dissection of the growth from the vessels was followed by prompt recurrence in a third case in spite of early and energetic radium treatment by Dr. H. A. Kelly.

Thyroid-gland Malignancies.—Total number of cases reported, sixty-two; one operative death and fifteen five-year cures, or a percentage of twenty-four plus. The total number of cases from the Mayo Clinic alone in which malignancy has been discovered by examination of the tissue after operation is 207, but a report as to the late results has not yet been given. In working out the questionnaire I neglected to ask for cases in which a diagnosis of probable malignancy was made before operation. Some state that in such cases far enough advanced to make a probable diagnosis before operation there is no possibility of cure, but at least four such permanent recoveries have occurred in the experience of members of this Association. The length of time that the disease is unrecognized and even unsuspected is often surprising. In most of my cases enlargement of the thyroid had existed at least ten years before the patient came for operation. When the public and the profession as a whole appreciate more fully the possible dangers of thyroid enlargement and we operate earlier the percentage of cures should be high. These cases are slow in their development locally, specially the large round-cell sarcomas, but in many instances metastasis has occurred to distant organs before the primary growth has been removed. One of my patients died four and one-half years after operation without any local recurrence but from metastasis to the spine. The earlier growths of the thyroid with operation before there has been extension beyond the capsule should be followed by permanent cure in most cases. Follow-up letters to 1318 of my former patients did not show any recurrence in cases which had not broken through the capsule in cases operated upon during the past sixteen years. In two of my cases with extensive malignancy of the thyroid of long standing, with infiltration of the

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great vessel sheath and larynx, thorough removal of the growth followed by the use of radium has given cure of seven years' standing in one case and eight years in another.

Branchial Cleft Malignancies.—A total of fifteen cases was reported with an operative mortality of two and five-year cures three. The results in branchial cleft malignancy depend, I believe, largely upon the duration and extent of the growth. I have operated upon only two cases, with one death and one nine-year recovery. In the first, recurrence, for which secondary operation was performed, occurred two years after the primary operation and a second recurrence and death a year after the secondary operation. In the second case there was extensive involvement of the surrounding structures including the thyroid gland. All diseased tissues were removed down to the great vessel sheath, which was infiltrated with the disease and was left without attempt to thoroughly extirpate the growth after closure of the common carotid. This patient was sent to Dr. Howard A. Kelly for radium treatment and was living at last report nine years after operation. From reports of others and my own experience, it is my impression that early operation gives a reasonable prospect for cure and that certain of the apparently hopeless cases can be cured by radium.

Parotid-gland Malignancies.—A total of 170 was reported with twenty-two five-year cures. Parotid-gland tumors during the early stage of development are usually encapsulated, not very deeply located, mildly malignant, and if completely removed a permanent cure should result. When neglected for years, as seen by most surgeons, these tumors frequently extend deeply into the neck along the base of the skull, giving considerable difficulty in operation, though permanent cure is still possible. If through growth, trauma or incomplete operation the cellular elements escape from the capsule, involvement of surrounding tissues is often rapid, the growth becomes highly malignant, the lymphatic glands become involved and the prospect of permanent cure is greatly reduced. When the growth has not broken through, if the capsule of the gland is carefully followed, injury to the facial nerve can almost invariably be avoided. Sistrunk's ² suggestions as to technic in avoiding the nerve are of great value in certain cases. The color distinction between the growth within the capsule and parotid-gland tissue is so slight that perfect light and a dry field are essential. Local anæsthesia is of great value, both in maintaining color definition and avoiding hemorrhage. I have operated upon eight cases which had not extended beyond the capsule, without injury to the facial nerve and with permanent recovery.

Doubtless almost all experienced surgeons have operated upon cases of the varieties mentioned without diagnosis of the true character of the disease. The likelihood of this is shown by Ried's ³ report of three cases of carotid gland from Johns Hopkins Hospital, who states that in one case the pathological report was perithelial angiosarcoma, but after operating upon the second case, six years later, the clinical similarities led to a restudy of the

growth, when its true nature was determined. Several writers do not feel inclined to class carotid-gland tumors among the malignant growths, but study of the literature and my own limited experience leads me to agree with Balfour⁴ that these growths are, as a rule, malignant and recurrences after removal are frequent. The very small number of reports which have appeared in the literature probably does not at all represent what has been done in the treatment of this form of malignancy. Probably the relative frequency of most of these conditions is not as great as that of thyroid malignancy, but the total would still be large.

Although there is considerable individuality shown by members of this Association in the choice of the roads which lead to the best end-results, no very vital differences in methods are apparent. Undoubtedly both our immediate and permanent results will be improved if the campaign of education of the American Society for the Control of Cancer can be pushed with something like the energy that has been put into the campaign for the prevention of tuberculosis.

To sum up briefly, what, if anything, has been accomplished by this inquiry? It seems to me that the figures which I have given are relatively valueless as far as establishing anything like a standard as to what our results in these cases should be is concerned. But they do indicate reasonably clearly: (1) That the end-results in certain cases, usually considered mildly malignant, are perhaps not so good as is generally supposed. (2) That a number of reliable observers have seen permanent results follow the use of Röntgen-ray and radium. (3) That certain forms of neck malignancy considered hopeless by some competent surgeons have been and are being operated upon with apparent permanent cure by several members of this Association.

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- ² Minnesota Med., March, 1921.
- ³ Johns Hopkins Hospital Bull., June, 1920, vol. xxxi.
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END RESULTS OF OPERATIONS FOR CANCER OF BREAST*

BY FRANK E. BUNTS, M.D.

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I HAVE not attempted in this paper to collect statistics from literature but rather to present the available records of the end-results of operations for cancer of the breast performed by my associates and myself. The personal equation enters so largely into the computation of statistical results that it would seem best to me to let each report stand upon its own basis rather than seek to obtain an average of the results of many different reporters. Such averages are useless as far as conclusions of any value are concerned. So many factors enter into the outcome of every case that I sometimes feel that the old method of approach, that of a careful study of the individual case, might be of the greatest value.

Into such an analysis must enter the question of heredity, for even if cancer be not hereditary there may at least be an inherited predisposition to it in certain individuals. The end-result is affected not only by the type of cancer, but probably even more by the age of the patient. The stage of growth also has its uncompromising influence, as do also the degree of metastasis, the regions or parts invaded, the physical resistance of the patient, and the willingness of the surgeon to operate in advanced cases if only to relieve pain and discomfort. All of these factors have their bearing upon the so-called end-results, and accordingly the preponderance of one or another of these factors in any series, might make the statistics of that series absolutely valueless as a basis of comparison with another group in which some other factor or factors preponderate.

The type of operation is often stressed, but this again seems to me to be of little more than secondary importance. The extent of the operation; the removal of the supraclavicular as well as of the axillary glands; the removal of extensive areas of skin, of one or both pectoral muscles, or of only part of one; the removal of the upper part of the aponeurosis of the rectus muscle—the value of any of these cannot in my opinion be based upon statistics but must depend to a great extent upon the operator's own experience, upon his estimate of the indications as he finds them in each individual case.

A study of the end-results of any series of cases, in particular of cancer, requires that note be taken not only of the treatment and the later course, but also of the incidence, possible etiological factors, and in particular the duration of symptoms before treatment; for it is impossible to foresee to what extent later studies may link the prognosis, even primarily, to one or more of these as well as to the method of treatment. Therefore, in this study of 600 cases of carcinoma of the breast which have been under the care of

* Read before the American Surgical Association, May 2, 1922.

my associates and myself, an attempt has been made to investigate the above points as well as the post-operative data.

In 553 of these cases the growth was primary; in 47 there were recurrences after previous operation elsewhere. These latter cases have not been included in this study.

As to the incidence, our oldest patient was eighty-four years of age, the youngest nineteen, the average age being approximately fifty years. The prognosis appears to be in inverse proportion to the age of the patient.

Regarding etiology, we were surprised to find a definite history of trauma in only seventy cases—12.6 per cent.; while in 105, or 19 per cent., the patient gave a hereditary history of cancer. While, of course, one cannot entirely depend upon the statements of every patient—which too often are based upon impressions rather than certain knowledge, nevertheless, such a large percentage as is given in the latter figure certainly appears to be very significant.

The peculiar danger of the painlessness of the earlier stages of new growths in the breast is emphasized by the facts: (1) That the presence of pain or tenderness was noted in only 251 of these histories, among which it was a first symptom in but 48 cases; and (2) that in 222 cases axillary involvement was diagnosed before operation, the involvement including the supraclavicular glands in 21 cases, the skin in three, the inguinal glands in one, the liver in one, and the femur in two.

Whether the delay before operation after a lump was first noticed in the breast was due to advice from the attending physician or to the reluctance of the patient to submit to operation cannot be known. These periods are given in the following table:

Duration of symptoms
(from time lump was first noticed.)

Less than 1 month.....	37
1-6 months.....	153
6 months—1 year.....	81
1-2 years.....	97
2-3 years.....	38
3-5 years.....	33
5 years	6
6 years.....	3
7 years.....	2
8 years.....	1
9 years.....	1
Over ten years	23

Fortunately the results of the cancer propaganda of the past few years are already being manifested in our clinics by the promptness with which patients with lumps in their breasts are being advised to consult a surgeon, and the increased readiness with which the patients themselves submit to operation.

OPERATIONS FOR CANCER OF BREAST

As for the later course of our 540 operative cases it has been possible to trace 341. Of these 174, or 51 per cent., are living, the length of life to date being distributed as follows:

Less than 3 years.....	80
3-5 years.....	13
5-10 years.....	47
10-15 years.....	18
15-20 years.....	12
Over 20 years.....	4

Among the 167 cases who have died since operation, ten died in the hospital and the duration of life of thirty is not known. Among the remainder, the duration of life was as follows:

Less than one year.....	42
Between one and two years.....	27
Between two and three years.....	19
Between three and five years.....	20
Five years.....	5
Six years.....	4
Seven years.....	1
Eight years.....	2
Nine years.....	2
Thirteen years.....	2
Fifteen years.....	1
Seventeen years.....	1
Eighteen years.....	1

Among these the cause of death is given as metastasis, 61; recurrence, 13; pneumonia, 5; cancer, 7. It would seem almost certain that the deaths listed above as due to pneumonia and cancer should also be classified as due to metastases. The remaining eleven died from causes which were not related to the operation or the diseases, *viz.*—one each from dropsy, cholelithiasis, nose-bleed, heart trouble, tuberculosis, hyperthyroidism, diabetes and "stroke," typhoid fever, stomach trouble, neuritis and old age.

Unfortunately in our study thus far we have not linked the end-results with the character of the involvement and the extent of the operation in the various cases. Such data will be offered in later reports.

As for recurrences, we have reports of 72 among the 341 cases whose later post-operative history has been traced. The location of these recurrences is given in the following table. (See next page.)

A few especial comments are suggested by these figures and by the experience of my associates and myself in individual cases.

The tendency of recent years has been away from the more extensive deforming operations. J. B. Murphy was among the first to advocate less resection than is required, for example, by the Halsted operation.

FRANK E. BUNTS

Recurrence and Metastases

I *Single*

Near incision.....	17
In axilla.....	9
In breast.....	15
In opposite axilla.....	2
In opposite breast.....	5
In glands of neck.....	1
In spine.....	2
In pectoral region.....	1
In thoracic wall.....	2
In scalp.....	1
In femur.....	1
In uterus.....	1
Carcinomatosis.....	2

II *Multiple*

Near incision and opposite breast.....	1
Near incision and breast.....	1
Near incision and glands of neck.....	3
Near incision and axilla.....	2
Near incision and chest.....	1
In axilla and glands of neck.....	2
In axilla and glands of neck and chest.....	1
In axilla and glands of neck and breast.....	1
In scalp and shoulder.....	1

The periods within which the recurrences appeared were stated in 63 cases, among which they occurred in less than six months in 28.5 per cent., from six months to five years, 55.5 per cent., and after five years in 15.3 per cent.

The following table gives the complete report of this series:

Period after operation when recurrence or metastasis appeared

Within 6 months.....	18
6 months—1 year.....	14
1-2 years.....	10
2-3 years.....	6
3-5 years.....	5
5 years.....	3
7 years.....	1
8 years.....	3
10 years.....	2
25 years.....	1

In the experiences of my associates and myself there have been few recurrences in the skin, excepting in cases in which massage had preceded the operative treatment, and these have yielded readily to X-ray or radium.

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Recurrences in the liver were not much more frequent than recurrence in the opposite breast or axilla, and if we were to follow logically the theory which had led many to adopt the routine removal of the upper sheath of the rectus we might also feel it necessary to remove the opposite breast and to dissect out the opposite axilla.

Our statistics indicate clearly that it is useless to fix an arbitrary time after operation when, if no recurrence has been noted, the cancer shall be considered cured—a three-year or even a five-year limit means little or nothing, for recurrences have taken place after more than fifteen years. It may be objected that these late cases are not recurrences but are new cancer growths. Possibly so, but certainly in view of the varying dates at which undoubted recurrences do occur, it is not possible arbitrarily to set a date at which they shall be deemed new growths and not metastases.

The wide range of tissues within which recurrences are found makes it difficult indeed to conceive of a sufficiently extensive operation to prevent the possibility of such a termination. In our earlier cases we uniformly gave X-ray treatment after operation, but while this appeared to benefit many, there were other cases in which the unusually rapid recurrence made us hesitate to continue this procedure as a routine. The explanation of the uncertainties of the X-ray treatment may perhaps be that in some instances we were getting a real therapeutic dose, which is always of benefit, while in others, owing to the uncertain measurement of the X-ray dosage, we only secured the stimulating or irritation dose which facilitates rather than retards growth. With the establishment of more certain methods for measuring the dosage, we have tentatively resumed the use of the X-ray and are carefully watching the results. The use of deep X-ray therapy in the treatment of cancers of the breast to the exclusion of operation opens a hopeful, but thus far non-productive field of speculation.

CONCLUSIONS

The successful treatment of cancer of the breast as of any other pathological condition should be strictly individualized.

The ultimate sequelæ depend more upon the stage and dissemination of the growth when it is presented for treatment than upon any defined method of operation.

Greatly increased data regarding the value of the pre- and post-operative use of the X-ray and of radium are required before final conclusions can be drawn, although there seems little doubt of the value of radium applied directly in the axilla.

The substitution of the X-rays or of radium for surgical treatment cannot safely be considered at the present time.

The early removal of any growth remains the one and only sure method of treatment.

END RESULTS OF OPERATIONS FOR CARCINOMA OF THE BREAST*

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AND

DONALD S. ADAMS, M.D.

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WE present herewith the results of 101 consecutive operations for cancer of the breast performed between 1905 and 1919. They were not selected cases. None were refused operation, no matter of how long duration or how far advanced, unless it were perfectly plain that the disease was quite impossible of removal.

They are therefore not an index of what can be done in carefully selected cases, but what may be expected in the average run of cases as they present themselves at the clinic or hospital for opinion and advice.

Of the 101 cases, in 93 a radical removal was attempted, including in the incision a wide margin of skin and excising the breast, both pectoral muscles and the axillary contents en masse. In seven, a partial operation was done; the breast was removed without the underlying muscles and without opening the axilla. This was done sometimes because malignancy was not suspected until the pathological report was received; and in others because the patient's general condition was such that a major surgical procedure seemed unwarranted.

In all the cases careful microscopical examinations were made of the breast and axillary contents by Dr. F. H. Baker, pathologist to the Worcester City Hospital, or by Dr. Roger Kinnicutt, pathologist to the Memorial Hospital.

There were two deaths; one from a partial operation, undertaken in the presence of a serious heart lesion in the hope of avoiding a cancerous ulcer—death on the eighth day from cardiac complication; and one about a month after operation from what was said to be diphtheritic infection of throat and subsequently of wound.

TABLE I

Number of cases 101.

Covering years 1905 to 1919 inclusive.

Average age, 53 years.

Youngest, 25.

Oldest, 80.

21 per cent. single, oldest 71, youngest 25.

79 per cent. married, oldest 80, youngest 32.

Left breast affected, 59 per cent.

Right breast affected, 41 per cent.

* Read before the American Surgical Association, Washington, May 21, 1922.

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Predominating type of lesion, adenocarcinoma.

Average time between patient's discovery
of breast condition and operation, 14 months.

Shortest time, 1 month.

Longest time, 10 years.

Percentage of patients dead, due to cancer, 68 per cent.

Percentage of patients dead, other causes, 11 per cent.

Percentage of patients alive over period of
3 to 16 years, 17 per cent.

Deaths due to general cancer, 44.

Deaths due to visceral metastases, 12.

Deaths due to lymphatic metastases, 9.

Deaths due to bone metastases, 3 (femur 2, sternum 1).

Inconclusive cases, 2.

Group I

Cases without recurrence, alive and well, 13.

Time elapsed since operation:

In 2 cases 3 years.

In 2 cases 4 years.

In 1 case 5 years.

In 1 case 6 years.

In 2 cases 8 years.

In 1 case 9 years.

In 4 cases 10-16 years.

Average 7.1 years.

Average time between discovery of condition
and operation, 6 months.

Shortest, 2 months.

Longest, 2 years.

Axilla involved, 36 per cent.

Axilla not involved, 64 per cent.

Group II

Cases with local recurrence, and still alive, 4.

Time of recurrence after operation,

1 year

2 years

3-6 years

4 years

Length of time since last operation,

10 years

7 years

3 years

3 years

Average, 5-7 years.

Average time between discovery of tumor and operation, 7 months.

Longest, 1 year.

Shortest, 6 weeks.

Axilla involved, 66 per cent. Not involved, 34 per cent.

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Group III

Cases with no local recurrence, but dead, 35.

Time after operation to death:

6 mos. to 2 years,	26.
4 years,	1.
5 years,	3.
6 years,	1.
7 years,	3.
8 years,	1.

Causes of death:

General cancer,	23.
Visceral metastases,	6.
Lymphatic metastases,	4.
Bone metastases,	1.
Cardio-renal,	10 days.

Average time between discovery of tumor and operation, 2 years.

Axilla involved, 84 per cent. Longest, 6 years.

Axilla not involved, 16 per cent. Shortest, 1 month.

Group IV

Cases having local recurrence which are dead, 39.

Time of local recurrence:

6 mos. to one year,	22.
2 years,	8.
3 years,	2.
4 years,	1.
5 years,	2.
6 years,	1.
7 years,	1.
9 years,	1.

Length of life after operation:

6 mos. to 1 year,	17.
2 years,	10.
3 years,	3.
4 years,	2.
5 years,	2.
6 years,	3.
9 years,	1.

Metastases causing death:

General cancer,	25.
Visceral cancer,	6.
Lymphatic cancer,	5.
Bone cancer,	1.

Average time between discovery of tumor and operation, 2 years.

Longest, 10 years. Axilla involved, 80 per cent.

Shortest, 2 months. Axilla not involved, 20 per cent.

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Group V

Cases having no local and no general recurrence, but dying of other causes, 10.

Time after operation:

3 years,	1.
4 years,	1.
5 years,	3.
6 years,	2.
7 years,	7.
9 years,	1.
15 years,	1.

Causes of death:

Cardio-renal,	4.
Apoplexy,	3.
Pneumonia,	1.
Infectious Arthritis,	1.
Accidental poisoning,	1.

Average time between discovery of condition and operation, 10 months.

Longest, 2 years.

Shortest, 1 month.

Axilla involved, 25 per cent.

Axilla not involved, 75 per cent.

Last year in a report of the End Results in Cancer of the Breast from the clinic of the Massachusetts General Hospital, Doctors Greenough and Simmons tabulated their statistics in a manner that is readily copied, and if followed by other reporters, makes comparisons and combined statistics easily available. We have, therefore, made a similar table from the results of our own studies:

TABLE II

Total entries, carcinoma breast,	101.
Re-entries, (entered more than once),	0.
Recurrence from previous operation,	0.
Cases available for study of operability, mortality, etc.,	101.
Radical operations,	94.
Partial operations,	7.
No operation,	0.
Operative deaths,	2.
Operative mortality,	2 per cent.
Operability: radical operations:	93.5 per cent.
Operability: all operations,	100 per cent.
Inconclusive cases: lack pathological examination,	0.
Inconclusive cases: untraced,	1.
Inconclusive cases died within time limit, without recurrence,	1.
Cases available for end results data,	99.
Radical operations,	92.
Partial operations,	7.
No operation,	0.
Number cases alive and well,	17.
Number cases died without recurrence,	10.
Number 3-year "cures" all operations,	27.
Number 3-year "cures" radical operations,	24.
Percentage of "cures" (all operations),	27 per cent.
Percentage of "cures" (radical operations),	26 per cent.

Although we are still far from any accurate knowledge of the cause of cancer of the breast, surgical opinion is pretty well agreed that it begins as a purely local process; that there must be a precancerous stage, and that the recognition of that precancerous stage is, from the standpoint of effective therapy, the most important object of investigation.

There are many forms of benign growth in the breast, some of which remain benign and may be retained for years without danger. But we believe the instances in which malignancy has followed a history of a tumor which has been present for a long time without evidence of growth or change, and without symptoms of any kind, are too many to be ignored; and are therefore firmly of the opinion that a tumor in the breast is always a menace.

The seriousness of the menace varies directly according to the age of the patient but is never negligible. We believe therefore that it is better to advise removal of any persistent tumor.

Furthermore we have been interested in the study of discharges from the nipple, and were not a little surprised to see in a recent admirable study of benign tumors of the breast the statement that: "The old theory that a discharge from the nipple called for removal of the breast was based on fear, and not on fact."†

In five of the cases here reported, or in approximately five per cent., a bloody discharge from the nipple was the first symptom observed, followed by a tumor, which in four cases was pronounced adenocarcinoma; the fifth will be mentioned later; of these four cases, one is living and well nine years after operation; one died of apoplexy two years after operation without recurrence, and two died of general carcinomatosis.

The fifth case was watched with unusual care for three years; it presented an intermittent serosanguinous discharge from the nipple, and after three years a small tumor, size of pea, could be felt near the margin of the areola; the breast was removed, and the lump proved to be a thickened and dilated milk duct from the wall of which projected a small papillary tumor which proved on microscopical examination to be cancer.

A sixth case has just come under our observation, which seems to add strong confirmation of our suspicion of these bloody discharges from the nipple. The patient presented herself in November, 1921, on account of an intermittent bloody discharge which had appeared within three months. Absolutely nothing could be found on most careful examination of the breast, and there was at the time no discharge. She was asked to report again in three months.

In March she reappeared with a history of continued discharge, a defined hardness in inner half of left breast, pressure on which started a bloody discharge from the nipple. Examination of the breast after operation showed numerous small cysts, especially in inner and upper quadrant of breast and a clearly defined area of adenocarcinoma with many mitotic cells.

† Journal A. M. A., vol. lxxviii, No. xii, p. 860.

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Our experience has therefore been distinctly suggestive of a direct sequence from bloody discharge to cancer; certainly the appearance of a tumor in the breast after a chronic discharge from the nipple is an imperative indication for operation; we cannot help feeling that when the possibility of a subsequent malignancy is involved, the preliminary sign is fact enough to occasion fear and to warrant the removal of the breast. We are strongly of the opinion that any suspicion of pathology in the breast demands earliest possible surgical interference.

The number of cases included in this report is too small to warrant any definite conclusions. It may be of value in the compilation of a large number of end results, and even then it must be remembered that this represents a group in which operation was never refused when the visible and tangible evidences of disease were removable; not a group selected with a view to favorable results.

The only inferences which may properly be drawn are, we think:

1. No time limit can be set beyond which recurrence may not occur.
2. Absence of malignant infiltration of axillary glands warrants much more favorable prognosis.
3. Any lump in the breast is to be regarded with suspicion and carefully watched.
4. Its persistence, and especially its activity, as indicated by increase in size, is ground for its removal, though not necessarily involving removal of entire breast.
5. A continued discharge from the nipple means pathology in the breast, must be kept under close observation, and be regarded with suspicion.

THE END RESULTS OF OPERATIONS FOR CANCER OF THE BLADDER*

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THE desideratum in reporting the end-results of any series of cases is to present information which will aid in determining the relative value of different methods of treatment. Only the collected experience of many observers over a fairly long period of time can be of final value, and it is, therefore, obvious that only by some uniform method of reporting end-results can such a collective study be made possible.

The need of such uniformity has been impressed upon me in my effort to gain information regarding the end-results of the treatment of malignant tumors of the bladder on account of the lack of the uniformity of the reports which have appeared in the literature, especially as regards diagnosis and the results of the various methods of treatment. For example, some authors consider that all bladder tumors are potentially malignant while others depend entirely upon histologic findings.

The methods of classification also vary greatly. Buerger's classification which has been rather widely adopted is as follows:

1. Papilloma.
2. Infiltrating papilloma.
3. Papillomata with early changes into carcinoma.
4. Primary papillary carcinoma:
 - a. Papillary polypoid type—carcinoma, Type I.
 - b. Secondarily infiltrating carcinoma—carcinoma, Type II.
5. Primary squamous-celled carcinoma:
 - a. Infiltrating type derived from papilloma.
 - b. Squamous type derived from papillary tumors.
 - c. Those derived from the prostate.
 - d. Metastases from source outside of the bladder.

Geraghty, writing in 1916, classified tumors from the therapeutic standpoint as papilloma, benign and malignant; papillary carcinoma, and adenocarcinoma. Malignant papillomas histopathologically, of course, are as much cancer as are papillary carcinomas, but Geraghty does not classify a malignant papilloma as a papillary carcinoma until the growth has begun to infiltrate the bladder wall.

Judd and Harrington make a general division of bladder tumors into two classes, one consisting of those which can be satisfactorily treated by endovesical methods and the other of those requiring operation; while Uhle and MacKinney say "there are practically two types of tumor, those amenable

* Read before the American Surgical Association, Washington, May 1, 1922.

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to high-frequency destruction and those that must be dealt with by radical operation."

It should be borne in mind that it is often impossible to determine absolutely the type of growth even by a frozen section at the time of operation, for, as is well known, in many cases a section from the outer edge of a tumor will not show any malignancy, while malignant changes will be manifest in a section through the base. We believe, therefore, that the cystoscopic picture which shows whether the tumor is pedunculated or sessile, whether it is encrusted or sloughing, whether it is simple or multiple—these findings being interpreted in their relation to the age of the patient—that this picture is about as dependable as any method of diagnosis.

The three cardinal symptoms of bladder tumor are hæmaturia, pain and frequency of urination. As indicated above, however, the diagnosis of an intravesical neoplasm cannot be made from the symptoms alone, but must be established by cystoscopic findings.

According to Barringer the clinical findings pointing to malignancy are:

1. Induration (by rectal or vaginal examination or by cystoscopy).
2. Slough. Only malignant tumors slough.
3. Lack of reaction to fulguration. Braasch states that if a tumor does not respond to three or four treatments by high-frequency current, it may readily be concluded that it is malignant.
4. Age of patient. The older the patient the more likely the growth is to be carcinoma.
5. Multiplicity and size of tumor. So-called benign tumors are more apt to be multiple.

In the literature the inoperability of a large proportion of cases of bladder tumor is rightly attributed to the length of time which elapses between the occurrence of the first symptoms and the operation. In this day when the diagnosis of bladder tumors is comparatively easy, these cases should reach the surgeon earlier. Lynch quotes a series of 115 cases in which 70 per cent. had had symptoms for from one to four years and 40 per cent. for from three to four years. In a series of 75 cases Caulk places the average duration of symptoms as ten years, while Judd reports that in a series of 181 cases the average duration of symptoms was twenty-six months. Thomas gives the duration of symptoms in a series of 62 cases as from two weeks to twenty-five years. Tardy recognition of the condition is certainly not due to lack of symptoms but rather to a lack of appreciation of the importance of the symptoms. Whether the fault lies with the general practitioner in failing to send patients with hæmaturia to those properly equipped to make an early diagnosis or with the urologists themselves in failing to acquaint the general practitioner with the necessity of speedily subjecting every case of hæmaturia to cystoscopy so that growths can be cared for in their incipency, is a debatable point. Blood in the urine is always pathological—never physiological. The doctor who is first consulted for hæmaturia must himself diag-

nose or have some one else diagnose the cause of bleeding before any treatment is inaugurated.

Methods of Treatment.—As this report deals with end-results for operations of carcinoma of the bladder we can only consider such methods of operation as have been in use long enough for statistics regarding them to be of value. We must therefore confine ourselves to a study of the end-results of surgical treatment—*i.e.*, the removal of the tumors by excision or by the use of the actual cautery. The results of recent methods of treatments by some form of radiation—radium or the X-ray—cannot properly be included at this time, not because we believe this may not be the method of choice in the future, but because sufficient time has not elapsed for the end-results to be established.

We still believe that carcinoma is a local disease and that the rational treatment is complete and radical excision of the involved area; that the disease remains local for a long period of time and does not metastasize readily. Every effort, therefore, should be made to get rid of the local involvement. Gardner, in 1915, drew the conclusion that in the treatment of carcinoma of the bladder the transperitoneal method or subtotal cystectomy, with wide resection of bladder wall, offered the best method. I do not believe that surgeons now feel that the transperitoneal method is the method of choice. A freer dissection of the bladder from the peritoneum, the walling off of the surrounding structures before the bladder is opened, the better protection of the tissues and, where it is possible, clamping around the tumor before the bladder is opened and cutting on the bladder side of the clamp, seem to offer an efficient method of preventing contamination and the transplantation of cancer cells.

Recurrence.—Albarran has stated that all vesical tumors are malignant or likely to become so. In Clado's opinion "recurring tumors following upon removal of benign papilloma are always in the form of malignant epithelioma." Young, in 1913, asserted that benign tumors are relatively infrequent and unless cured almost always become malignant. Judd and Sistrunk believe that most of the recurrences come within the first few months after operation, their statistics showing that if the patient can survive the first year, his chances to remain well are increased. Geraghty feels that patients with multiple tumors seem more prone to recurrences than those with only one tumor and that the tendency to recurrence grows progressively less with each successive year.

This tendency of tumors of the bladder of all grades of malignancy to recur, whatever the method of removal or the thoroughness of operation, has long been recognized. Eternal vigilance is required. These patients must be advised to return at stated intervals for cystoscopic examination. The intervals between the successive examinations should be: three months, three months, six months, six months, six months, one year, one year, and one year, thus covering a total period of five years. If there is no recurrence during

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this five-year period, it may be considered reasonably certain that there will be no further trouble. By using a small cystoscope the recurring examinations are practically painless. This is an important point, as patients will not return for repeated examinations if suffering is entailed.

End-results.—As to the end-results of the strictly surgical treatment of carcinoma of the bladder the data which we have been able to secure from the literature are about as follows:

In 1915 Gardner reported on 1702 cases of bladder tumors. Of this total 369 cases had been collected by Gardner himself. Of the personally compiled series there were 178 carcinomata. In 58 the bladder was partially resected and in 86 the growth was excised. The operative mortality was 27.5 per cent. for the resections; the percentage of recurrence in less than three years was 43.9, but only 2.4 after three years; the percentage of freedom from recurrence in less than three years was 36.5 and after three years was 17. The operative mortality for excisions was 14 per cent.; the percentage of recurrences in less than three years was 76.3 and after three years was 5.5; the percentage of freedom from recurrences was 18 in less than three years and after three years was one.

In 1917 Geraghty reported a series of 146 cases, of which 74 were papillary carcinomata. Eighteen, or 25 per cent., of the 74 were operable. Of the 18, eight had died since operation, and of the ten living seven had been living less than a year, one for four years, one for five years and one for six years.

Thomas, in 1920, reported 62 cases. Of the 18 subjected to operative procedures 50 per cent. died in the natural course of their disease, excepting two operative deaths—a mortality of 14.3 per cent. No statement is made as to the exact number of carcinomata among 18 cases operated upon and the lapse of time since operation is not given for the nine survivors.

Scholl, reporting in 1922, states that of the 333 cases of bladder tumors treated at the Mayo Clinic between 1910 and 1920, 216 were operable. "One hundred and four (48.2 per cent.) of the 216 from whom tumors have been removed completely are alive, an average of 3.2 years after operation; 112 (51.8 per cent.) are dead, an average of eight months after operation." Among the 168 epithelial tumors removed at operation there were 71 malignant papillomata and 94 solid carcinomata. "Twenty-six (36.6 per cent.) of patients in the first group have been dead on an average of eleven months after operation, in contrast to 67 (71.2 per cent.) of the latter group who died on an average of seven and one-half months after operation. Forty-five (43.4 per cent.) of the patients with malignant papillomata are alive on an average of three years and three months since their operation, in contrast to 27 (28.8 per cent.) of the patients with solid carcinoma who are alive on an average of two years and three months."

End-results in Personal Series.—My personal records include 222 cases of bladder tumors, among which 108 were malignant growths. Operations

were performed in 81 of these with an operative mortality of 9.8 per cent. Excision was employed in 59, or 72.8 per cent., of these cases, the cautery was used in 10, combined with surgery in 8, and transplantation of the ureters was performed in 4 cases, in two of which extirpation of the bladder was done also.

We have data regarding the length of life of 61 of the cases operated upon, and of 12 of those not operated upon. Among the former, 41, or 67.2 per cent., have died, 21, or 51.2 per cent., in less than one year after operation; the length of life of the remaining 18 being distributed as follows: 9, less than two years after operation; 3, between two and three years after operation; 1 within five years after operation; the length of life being unknown in the remaining five. Among the 22 cases still living after operation, the length of life has been as follows:

8—less than 1 year
5—between 1 and 2 years
4—between 2 and 3 years
1—5 years and 9 months
1—6 years
1—8 years and 10 months
1—10 years
1—11 years

Among the twelve cases not operated upon, seven have died, six in less than one year after the consultation; the date of death of the other not being known. Of the remaining five non-operative cases two are living less than a year after the consultation, and three between one and two years.

Among these cases of carcinoma of the bladder we have records of recurrences in 18, the length of time between the operation and the first recurrence varying from one month to one and a half years, with one case in which the first recurrence was noted after eight years. In seven cases there was a second recurrence from one to four months after the first; in one case two recurrences after the first at successive intervals of three months each; and in another three recurrences after the first at intervals of two, ten, and five months, respectively. This last case is still living, two and a half years after his primary operation.

A study of the end-results in their relation to the type of operation has yielded the following figures:

Treated by excision	64 per cent.
Recurrence in	30 per cent.
Living over 5 years	7 per cent.
2 cases living over 5 years with no recurrence (6 years, 11 years)	
2 cases living over 5 years with recurrence (9 years 10 years)	
Treated by cautery	10 per cent.
Living over 5 years	1 (6 years)
Recurrences	0

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Of equal value from the subjective point of view of the patient, certainly, with his length of life, is his economic status. Unfortunately we have data regarding this point in only a limited number of our living cases of carcinoma. Of these, 62½ per cent. report that they are able to do full work, that is, that their economic status is 100 per cent. restored; 12½ per cent. were able to do part-time work, and 25 per cent. report that they are unable to do any work.

CONCLUSIONS

The following conclusions are drawn from the available data of cases reported in the literature in this country and from my own series:

1. A large percentage of the malignant cases are of papillary origin, which means that they were referred late to the surgeon.
2. The percentage of recurrence is great whatever the method of operation, whether excision or cauterization.
3. Recurrence is no contra-indication for treatment, as some of the best results have resulted from operation on cases with recurrences.
4. Repeated observation after operation is absolutely essential if the mortality of carcinoma of the bladder is to be reduced.
5. The good results of the treatment of recurrences are due to the fact that recurrences are nearly always local and very seldom metastasize.

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RESULTS OF THE TREATMENT BY RADIATION OF PRIMARY INOPERABLE CARCINOMA OF THE BREAST*

A REPORT OF 83 CASES TREATED IN THE BREAST CLINIC AT THE MEMORIAL HOSPITAL OF NEW YORK, N. Y.

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OF NEW YORK, N. Y.

SINCE the establishment of the breast clinic at Memorial Hospital in the fall of 1919, there has been a systematic effort to study the whole problem of carcinoma of the breast. Beginning with the pioneer work done by the late Dr. H. H. Janeway, prior to 1919, considerable progress has been made in the treatment of inoperable mammary cancer by radiation, and the present report includes not only the cases under my own supervision, but also those of my colleagues at the hospital. All of the patients were admitted in the years 1918, 1919, and 1920, leaving a period of sixteen months since the last case under report began treatment.

A primary inoperable breast carcinoma is one in which one or more of the following factors are present:

- A. Fixation of the breast tumor itself to the chest wall.
- B. Involvement of the supraclavicular nodes.
- C. Definite involvement of the opposite axillary nodes.
- D. Diffuse subcutaneous nodules.
- E. Diffuse inflammatory carcinoma involving a considerable skin area.
- F. Chest metastases—pleural or mediastinal.
- G. More remote metastases.

All surgeons will not perhaps be in accord with these indications of inoperability.

A. We believe that fixity to the chest-wall places the patient in the inoperable class. Under these circumstances several additional areas are usually the seat of the disease.

B. We have considered involvement of the supraclavicular nodes a sign of inoperability because we believe that a complete dissection of this area is practically impossible without a division of the clavicle itself. We have taken this position after careful consideration of the usual course of the cases with supraclavicular involvement, with and without operation.

In the clinic, several cases which we had considered inoperable because of supraclavicular involvement, and were treating by radiation, have gone elsewhere and had a radical operation performed. One such case entered the clinic with definite, small, hard supraclavicular nodes. She returned six weeks later following a radical amputation, with the supraclavicular nodes three times as large as when we first saw her, and in spite of any type of radiation, is rapidly succumbing to the disease. In our judgment, this patient

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was made distinctly worse by the radical procedure adopted. We have also noted that a definite fulness in this region often precedes the appearance of distinct nodes, the first node usually palpable, being the one directly behind the inner end of the clavicle. Nevertheless, this sequence is not invariable, and we consider the case inoperable only when definite, firm nodes may be palpated.

C. If the surgeon cannot palpate axillary nodes, it is no proof that numerous small nodes may not be present, but when a definite hard node is to be felt in the opposite axilla, one may feel reasonably sure that this indicates carcinomatous involvement. Not infrequently we have found the opposite axilla the seat of disease, often without apparent involvement of the opposite breast.

D, E. No question can exist in the mind of any surgeon, that the patient is inoperable in the presence of diffuse subcutaneous nodules, or diffuse cancerous involvement of the skin. We have numerous examples of these types of metastases in the clinic, treated by operation or radiation,

or by both methods, and we have a very deep conviction that radiation offers much the better outlook for the patient.

F, G. No one can doubt that pleural and mediastinal metastases, as well as a spread of the disease to remote areas, indicates inoperability.

A case having been classified, two questions are asked concerning it:

First: What can we do for this patient?

Second: What may we learn from this patient?

A. What can be done for the primary inoperable carcinoma of the breast?

1. Check considerably the rate of growth of the carcinoma, frequently causing a considerable regression and at times a disappearance of the carcinoma. The persistence of a mass in the breast may not necessarily indicate that active carcinoma is still present. Fibrous tissue replacement may leave



FIG. 1.—Case No. 83, C. A. Untreated cancer of the breast. Patient lived twenty-two years and five months.

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a definite hard tumor mass, which may be misleading in estimating the exact effect of radiation upon the tumor itself.

2. Involved nodes in the axillary or supraclavicular regions may be expected to regress considerably, and in some instances they have entirely disappeared under treatment by radiation.

3. A fixed breast tumor may be rendered mobile, permitting a palliative operation with removal of the breast itself, eliminating the possibility of subsequent ulceration. Four of our cases who are doing particularly well received this type of treatment (25, 36, 46, 56).



FIG. 2.—A. F. Inflammatory cancer of the right breast. A type which rapidly recurs if operated upon.

4. Relieve in some measure the patient's discomfort and pain. The effect upon spinal metastases has been variable, but in a few instances there has been a marked relief of pain over a considerable period.

One is compelled to admit that certain cases presenting themselves at the hospital are altogether too advanced to hope for any good result by any means of treatment. Too much emphasis cannot be placed upon the unwisdom of promising patients with advanced disease remarkable results from radiation or any other form of treatment. Such cases, however, are often given mild X-ray radiation for the moral effect, but the family are told what we believe to be the truth concerning the case. The Social Service Department of the hospital has done a fine humanitarian work in the care of these patients—dressing ulcerating areas where home conditions of the patients permit it, and providing for the entry of other cases into institutions devoted to this incurable group.

But the surgeon may ask at once, Is not this a general disease and what of the mediastinal, pleural, and pulmonary metastases, as well as those of the spine, liver, etc. ? We fully appreciate the rapidity with which dissemination occurs and are convinced that it spreads far more rapidly to other areas than up to the present time we have fully realized. Nevertheless, at first it is a local disease and therefore amenable to local attack in its early stages. I venture to express the belief that ultimately a more complete radiation of the chest areas will be routinely practiced in the effort to forestall and check any possible early involvement in these regions. The problem of such a program is not devoid of many practical difficulties, for normal intervening



FIG. 3.—Case No. 53, A. R. March 17, 1920, before radiation.

tissues are also extensively radiated and the patient's general resistance may be seriously lowered with marked anæmia and aggravated digestive disturbances following a prolonged radiation; therefore any effort to completely radiate the chest and mediastinum must take into account the patient's general strength and her reaction to radiotherapy.

B. What may we learn from the patient?

The clinical pathological data being developed in the institution will ultimately throw much light upon this problem. Statistics are always uninteresting and frequently misleading, but there are a few facts concerning the group under report which I will briefly touch upon. The complete list of cases appended contains additional data.

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Age.—The age of the patients varied from twenty-two to eighty-four years, the average being fifty-four.

Between the ages of 21 to 30.....	2 patients
Between the ages of 31 to 40.....	11 patients
Between the ages of 41 to 50.....	22 patients
Between the ages of 51 to 60.....	28 patients
Between the ages of 61 to 70.....	11 patients
Between the ages of 71 to 84.....	7 patients

(In two patients, no age was mentioned.)

Trauma.—As a possible etiological factor, fairly definite trauma was present in twenty-four of the eighty-three cases, or 28.9 per cent.

Lactation.—Thirty-five of the patients had never had a lactating breast, giving a percentage of 42.2 per cent. Approximately one-third of the patients

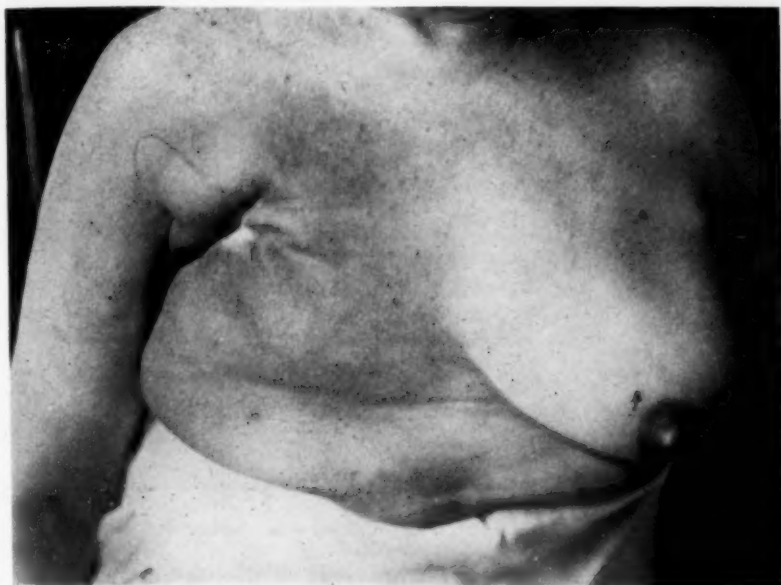


FIG. 4.—No. 53, A. R. April, 1920, present condition: there is still considerable tumefaction underlying the area of retraction.

presenting themselves at the hospital with breast carcinoma have never had a lactating breast.

Pathology.—Whenever it is possible, a section of the tumor tissue is secured. We are succeeding more regularly in this effort in the past two years than in the years 1918 and 1919, there being pathological reports upon thirty-four of the eighty-three patients, six upon very advanced cases and twenty-six out of the fifty-seven patients considered suitable for treatment. Of the thirty-three cases in which pathological examinations were made, eight showed fibrocarcinoma, twelve carcinoma simplex, nine alveolar carcinoma, four infiltrating carcinoma, and one plexiform carcinoma. In five instances the tumor was believed to have a sweat-gland origin rather than

one from breast tissue itself. We hope later to develop some data upon the behavior of these so-called sweat-gland carcinomas of the breast, but at the present time have nothing to offer.

The primary inoperable carcinoma has usually gone into the infiltrating stage whatever the primary type of tumor may have been. In fact, if one searches diligently throughout the whole tumor one may find varied types of carcinoma, perhaps in one section fibrocarcinomatous elements and in another area a more markedly cellular appearance. Early in the disease certain anatomical types may be expected to run a certain clinical course. An encapsulated adenocarcinoma, which later goes on to a fungating stage, runs



FIG. 5.—Case No. 56, M. S. January 24, 1921, large fixed inoperable tumor of the right breast.

an entirely different clinical course than a hard fibrocarcinoma of an older woman or a diffuse, markedly cellular, carcinoma in a young woman. However, when the disease has become more fully developed, a histological study of a single specimen removed from a breast cancer may give very little information to the surgeon concerning the probable clinical course of the disease from that time on. Nevertheless, it is advantageous that pathological data be obtained whenever it is possible.

Treatment by Radiation.—Frequent visits to the breast follow-up clinics make it possible to obtain accurate data upon the progress or regression of the disease. A weight record gives a very fair index of the patient's state of health, though we have observed in many instances an advance of the malignant process with no loss of weight or obvious impairment of the health. Upon the other hand, when a case of inoperable breast cancer begins to lose weight rapidly, we realize that not many months will elapse before the

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patient will succumb to the disease. In his study of the treatment of breast carcinoma by radiation, the writer wishes to gratefully acknowledge the hearty coöperation given to him by Doctor Herendeen, the röntgenologist at the Memorial Hospital.

Treatment by X-ray.—If the growth is one of considerable size, we usually rely upon X-ray radiation. This is given in cycles of four or five treatments per cycle, at intervals of one, two, or three days between treatments. The breast, anterior chest-wall, lateral chest-wall, axillary and supraclavicular regions are covered by this radiation. The usual dosage with a ten-inch spark-gap is fifteen minutes of treatment, using a ten-inch focal distance,



FIG. 6.—Case No. 56, M. S. April, 1922, present condition; nodes in the right axilla are now not palpable. Patient has gained twenty-two pounds.

four milliamperes of current, and four millimetres of aluminum filtration. This gives the average patient a very definite erythema of the skin, but no blistering. There is, however, a wide variation in susceptibility to radiation, and, while some stand a larger amount of radiation than others without damage to the skin, in general the dosage outlined is a safe one to use. The danger of overradiation by X-ray must always be borne in mind. It is far better to be satisfied with a reasonable result than to attempt the impossible. Marked telangiectases developing in the skin should be considered a contra-indication to further treatment by radiation. If this precaution is not observed ulceration will often ensue with, at times, a development of an epithelioma. There is no instance in this report of any patient developing epithelioma from overradiation.

If the tumor tissue is quite superficial, or there are numerous subcu-

taneous nodules, or there is a diffuse pseudoinflammatory involvement of the skin by the new growth, X-ray for a shorter period, giving a more superficial dosage, yields the best results. There have been some remarkable disappearances of skin nodules and carcinomatous skin involvement by this means. As a rule the whole side is radiated, including the supraclavicular and axillary regions. An interval of five or six weeks is allowed to elapse before the second cycle of treatment is undertaken, and in the meanwhile the patient is seen several times that the reaction to radiation may be observed.

As a rule the effect upon the breast tumor or upon axillary or supraclavicular nodes from this type of radiation is a distinct diminution in size



FIG. 7.—Case No. 77, W. L. June 9, 1920, before X-ray radiation. A very advanced, rapidly growing cancer of the left breast.

appreciable in from three to seven weeks. If after two or three such cycles there seems to be no further advance in the disease, it is wiser to defer radiation for a period, the patient meanwhile being kept under observation.

We are convinced that unless the radiation causes a considerable erythema of the skin, the underlying mass does not receive sufficient radiation to properly affect the carcinomatous cells. Systematic treatment of chest metastases has not yet been undertaken at the hospital, but we are hoping that something may be accomplished with our new high-powered machine now in operation, giving 200,000 peak voltage through the tube with a spark-gap of 14 inches. One cannot, however, forget when one is radiating carcinoma deep within the chest cavity, that everything between that point and the source of radiation is also being heavily radiated, furnishing a serious obstacle to effective radiation of the tumor.

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Treatment by Radium.—The type of cases best suited to radiation by means of radium are small breast tumors with involvement of axillary and supraclavicular nodes and tumors involving the sternum and chest-wall to a moderate degree. With the small breast tumor, after complete X-ray radiation, the insertion of radium bare-tubes, using one mc. per cubic centimetre of breast tumor, gives very satisfactory results. This insertion of bare-tubes is done under novocaine anæsthesia. The tubes are introduced through needle canulæ, the little glass tube containing the radium emanation being forced into the breast tumor at any desired point by pressing a minute plunger in the needle. This must be done in a very systematic fashion, and one must

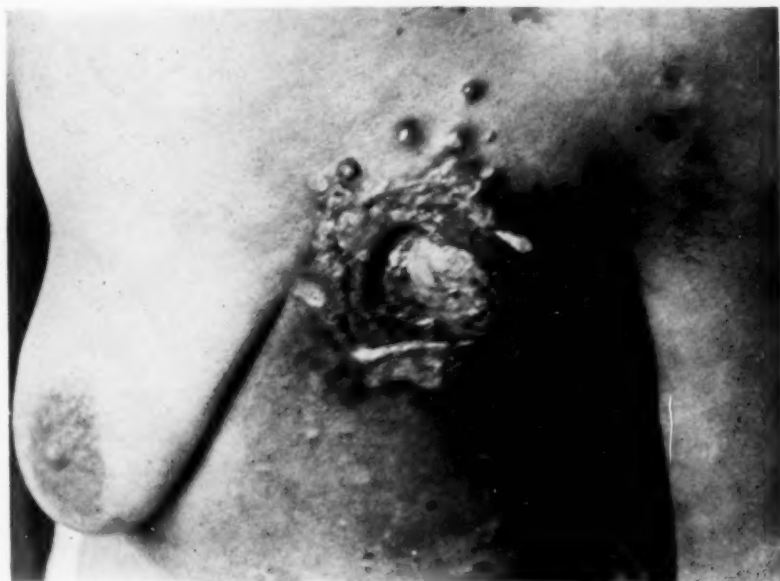


FIG. 8.—Case No. 77, N. L. Same case as in Figure 7. July 30, 1920, after X-ray radiation, showing marked local effects from radiation.

be reasonably certain that all parts of the tumor have received an adequate insertion of radium. The same method may be employed in the axillary region if the nodes are not closely adjacent to the brachial plexus or not too deeply placed in an inaccessible position. One may introduce these tubes to within a distance of one centimetre from the nerves, but closer introduction will cause an intractable case of neuritis. The bare-tubes containing the radium introduced through the skin or through a minute incision, which also permits the removal of a section, must never be placed nearer than one centimetre from the outer surface of the skin, or ulceration will ensue. The treatment by bare-tubes has given us some excellent results, with complete disappearance of the tissues in some instances, over a period of two years up to the present writing.

Upon the other hand, a case which has received extensive external

radiation by X-ray or radium, with beginning areas of telangiectasis, is a poor one in which to insert radium bare-tubes, as the tissue vitality is poor and ulceration may ensue. In a tumor a little larger, say four centimetres in diameter and upwards, we frequently make use of a platinum needle carrying 50 to 70 mc. of radium gas, contained in glass tubes, the platinum needle having a thickness of .4 of a millimetre. This is introduced through the skin into the tumor and is allowed to remain there until the new growth receives approximately 50 mc. hours of treatment for each cubic centimetre of tumor tissue. The needle is partially withdrawn at fixed intervals,



FIG. 9.—Low-power, showing radiation effects on a cancer of the breast.

permitting radiation of additional parts of the tumor. We have had some excellent regressions by this method, and in one instance an entire disappearance of the tumor. A sufficient time, however, has not elapsed to determine whether or not there may be a reappearance of the carcinomatous mass.

External radiation by means of a radium pack, using 8500 to 9000 mc. hours for 70 square centimetres of surface, at a distance of 6 cubic centimetres from the skin, with a filtration of $\frac{1}{2}$ millimetre of silver and 2 millimetres of brass, gives frequently an excellent regression in a small, well-localized tumor of the breast, sternum, or chest-wall, and axillary

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nodes are also treated by a similar pack placed over the base and anterior aspect of the axilla. The supraclavicular region is best radiated by means of the brass tray containing radium emanation, if the nodes are superficial, the distance from the skin being 3 centimetres, with a filtration similar to that of the pack, giving 2500 to 3000 mc. hours of treatment. If the nodes are extensively involved or more deeply placed, the pack is preferable. External radiation with radium may be repeated at a like interval to the Röntgen-ray treatments, and patients are followed in the meantime to determine the exact response to radiation.

Pathological Changes from Radiation.—Aside from the clinical evidence of marked diminution in size or even complete disappearance of a tumor



FIG. 10.—High-power, showing radiation effects upon cancer of the breast.

by radiation, there are also macroscopical and microscopical changes. Macroscopically small areas of necrosis may be seen for a distance of one centimetre in all directions from the point of insertion of radium bare-tubes, and the same type of gross necrosis may be evidenced following external radiation. The microscopical effects following treatment by radium and X-ray may be very marked, consisting of hyperchromatism of the nuclei, hydropic degeneration of the cytoplasm of the cell, and a granular degeneration of the connective-tissue stroma surrounding the carcinomatous cells. Ultimately the tumor cells may disappear and nothing but a granular detritus remain. Frequently, well-marked endarteritis may be observed in the blood-vessels within the radiated area. Eventually the fully radiated areas are reduced to hard fibrous cicatricial tissue.

Duration of Life.—We have found such a startling difference in the life-

history of these cases that at times it almost seems as if the rapid and slow cases must be different diseases. One patient presenting herself at the clinic had never been operated upon and had never been treated, but had lived for twenty-two years with a carcinoma *en cuirasse* covering a large part of the anterior chest-wall. She eventually succumbed to the disease. (No. 83.) At the moment we doubt the wisdom of attempting to draw any conclusion as to the prolongation of life in a case of inoperable carcinoma of the breast treated by radiation. Few figures upon this subject can be obtained. Lazarus Barlow has stated as far back as 1904 and 1905 that the average life of untreated carcinoma or unoperated carcinoma of the breast was 38.5 months.

The total duration of life of patients in this report is as follows:

In the very advanced group (of 26) we found that the duration before treatment averaged two years, 5.8 months, with a maximum duration for one patient of 22 years and a minimum duration of two weeks. The duration after admission to the hospital averaged approximately four months,

I. Doing badly

No.	Initial	Duration After Treatment
5	E.M.	3 years, 8 months
8	A.T.	3 years, 5 months
18	A.H.	2 years, 9 months
23	M.K.	3 years
29	M.B.	15 months (data incomplete)
28	A.B.	1 year, 6 months
31	C.D.	2 years, 3 months
41	C.M.	13 months (data incomplete)
43	M.M.	2 years, 2 months
48	M.O.	1 year, 7 months
51	A.H.	15 months (data incomplete)
55	L.G.	1 year (data incomplete)

II. Doing well

No.	Initial	Duration After Treatment
9	L.N.	4 years
25	A.S.	2 years, 9 months
26	E.T.	3 years, 5 months
30	M.C.	1 year, 7 months
32	M.D.	1 year, 6 months
33	E.A.	1 year, 5 months
35	T.C.	1 year, 5 months
36	A.F.	1 year, 11 months
44	S.M.	1 year, 10 months
46	M.M.	1 year, 10 months
47	M.N.	2 years, 5 months
53	A.R.	2 years, 1 month
56	M.S.	1 year, 8 months

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with a maximum duration of one year, and a minimum duration of two weeks. The average total duration of life for the very advanced cases was two years, 9.2 months. Maximum duration: 22 years, 5 months; minimum, nine weeks.

In cases which seemed suitable for treatment we found that the average duration before treatment was two years, four months, the longest duration in one case being eighteen years, the shortest one month. The duration of life after admission gave an average of one year, seven and a half months, the longest duration being four years, and the shortest two months. The average total duration of life in these 57 cases was four years and three-tenths of one month, the longest case giving a duration of nineteen years and eight months, and the shortest one year, two months. As one may readily see, the average duration in the 57 cases favorable for treatment was almost a year longer than the figure of 38.5 months quoted from Barlow.

Finally, as to the living and the dead. At the present writing all of the 26 advanced cases are dead and the details concerning them will be found in the tabulated report which accompanies the written text.

Of the 57 cases which seemed worthy of treatment, 25 are to-day alive and 13 of them are doing well. The tabulated results of the 25 cases is appended in order that the data may be more readily available.

Average duration of life after treatment of those doing well is two years, 3.1 months, the longest duration since treatment being four years, the shortest one year and five months.

CONCLUSIONS

In conclusion the following points should be emphasized:

1. Primary inoperable carcinoma of the breast has shown good results by radiation.
2. The patient must be kept under constant clinical observation.
3. The type of radiation must be properly selected for each individual case. No routine prescription will suffice.
4. Overtreatment by radiation must be avoided.
5. Very advanced cases are unsuitable for any form of treatment.
6. The palliative operation following properly planned radiation is of service in well-selected cases.
7. A cooperating Social Service Department makes a follow-up system effective and gives humanitarian relief to the hopeless cases.
8. The results to date are very gratifying and encouraging. As the disease itself and the technic of radiation become better understood, we believe that more and more satisfactory results will follow, and that the possibility of still further control of the disease by radiation may ultimately be realized.

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DIGEST OF CASES OF PRIMARY INOPERABLE

No.	Name	Age	MSW	Lact	Trauma	Date first symptom	First symptom	Date of admission	Condition on admission
1	R. C. (Quick)	45	M	?	None	Aug. 16	Eczema of nipple	Aug. 18	Left breast upper outer quadrant. Mass 3x5 cm. Axillary and supraclavicular nodes. Breast mass reddened.
2	S. G. (Quick)	54	M	0	Corset pressure	Aug. 18	Pain, shortly followed by redness near nipple	July 18	Left breast <i>en cuirasse</i> . One-third of breast surface red and hard. Axillary nodes. Supraclavicular?
3	M. L. (Quick)	58	M	2	None	July 15	Mass outer lower quadrant right breast	July 18	Right breast, multiple nodules in breast. Axillary and both supraclaviculars. Right sprac., skin fixed over it.
4	B. L. (Janeway)	39	M	2	None	Oct. 17	Mass in left breast and pains	Apr. 18	Tumor just above nipple, left breast, 3x2 cm. Axillary and supraclavicular nodes.
5	E. M. (Stone and Lee)	51	W	0	Yes	Sept. 15	Small movable lump right br.	July 18	Large hard tumor right breast, 10x11 cm. Fixed to muscle. Axillary and supraclavicular nodes.
6	K. M. (Janeway)	60	M	0	0	Dec. 17	Small lump, right breast	Aug. 18	Tail right breast ulcerated. Hard axillary nodes. Small supraclavicular nodes. Arm swollen.
7	M. H. P. (Coley)	43	S	0	None	Sept. 15	Hard lump, lower inner quadrant right breast	Sept. 18	Right breast, central position, hard nodular size of orange. Attached to muscles. No nodes.
8	A. T. (Quick)	65	M	0	Yes	Nov. 14	Small lump, right breast. Later painful	Nov. 18	Right breast shrunken hard, adherent to underlying structures. Discolored. Ulceration about nipple. Axillary nodes.
9	L. N.	55	M		Yes	Apr. 9	Swelling near tail of breast and axilla	Apr. 17	Large ulcerated tumor, involving upper inner quadrant left breast. Some axillary nodes.
10	F. B. (Quick)	60	M	13	None	Jan. 18	Red inflamed, left breast	Jan. 19	Whole left breast 20x24 cm. <i>en cuirasse</i> . Very red, fixed to deeper structures. Axillary nodes?
11	M. B. (Janeway and Lee)	45	M	2	Yes	June 18	Small lump, left breast	Oct. 19	Left breast hard, infiltrating, fibrosed. Red, almost ulcerating. Fixed to muscle. Large axillary nodes. Small supraclavicular nodes.
12	E. B. (Quick and Lee)	62	W	3	None	Aug. 11	Small hard lump, left breast	Aug. 19	Left breast, outer quadrant, cauliflower ulcerated growth, 5x7 cm. Ulceration extends into axilla. Also axillary nodes.
13	M. C. (Janeway)	84	W	8	Yes (?)	Apr. 19	Small lump, left breast	Oct. 19	Above left nipple indurated mass 6x4 cm. ulcerating in center. Large hard axillary nodes.
14	L. C. (Quick)	56	M	1	None	Sept. 16	Nodule outer upper edge right nipple	Sept. 19	Nodule, upper outer part, right breast, fixed to deeper parts. Axillary nodes.
15	G. E. (Quick and Lee)	34	M	1	None	Jan. 18	Small lump upper inner quadrant right breast	Mar. 19	Whole right breast involved in tumor process. Few nodes in axilla, adherent to mass 3 cm. right side of sternum

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CARCINOMA OF THE BREAST, TREATED 1918-1919

Path. type	Treatment	Result of treatment	Course	Duration before admission	Duration after admission	Total duration with result
Fibrocarcinoma No. 3835	X-ray		Rapidly, locally worse	2 yrs.	14 mo.	3 yrs. 2 mo. Died
	X-ray		Later developed metastases of spine	3 mo.	1 yr.	1 yr. 3 mo. Died
	X-ray		Progressively worse	3 yrs.	19 mo.	4 yrs. 9 mo. Died
	Radium, X-ray	Regression in size of mass		7 mo.	1 yr. 8 mo.	2 yrs. 3 mo. Died
	Radium (bare-tubes pack), X-ray	Very marked local regression for two yrs. after admission. Later breast ulcer. Local palliative removal, skin-graft	Past year skin recurrences and left breast involved with progression of disease	3 yrs.	3 yrs. 8 mo.	6 yrs. 8 mo. Patient in Home for Incurables. Alive
	Radium (bare-tubes to breast tumor and axilla)	Some regression	Rapid	10 mo.	10 mo.	1 yr. 8 mo. Died
	Radium (bare-tubes for breast) X-ray	Diminution in size of growth	Slow progression of symptoms. Chest metastases	3 yrs.	3 yrs. 6 mo.	6½ yrs. Died
	Radium (pack) X-ray	Some diminution in size of tumor	Last yr. gradual failure in health	4 yrs.	3 yrs. 5 mo.	7 yrs. 5 mo. Alive, but bed-ridden in Home for Incurables
	Palliative operation, by Dr. Bolling. Radium, X-ray	Recurrence, near scar, 1 or 2 in about 3 yrs. Later supraclavicular node, right ax. node. Small mass over scapula	Doing well in spite of dissemination. No loss of weight	8 yrs.	4 yrs.	12 yrs. doing well in spite of dissemination
	X-ray		Developed metastases fourth and fifth lumbar vertebrae	1 yr.	9 mo.	1 yr., 9 mo. Died
Ca. simplex, probably sweat-gland ca. No. 2428	Radium (bare-tubes in breast tumor)	Primary regression	Ulceration extended, swollen arm. Chest metastases. Pagets	16 mo.	7 mo.	23 mo. Died
	X-ray (palliative removal of breast by cautery, Apr. 1920)	Relief from sloughing breast	Disease progressing	8 yrs.	1 yr. 10 mo.	9 yrs., 10 mo. Died
	Radium (externally and bare-tubes in breast)	Very little change		6 mo.	9 mo.	1 yr., 3 mo. Died
	Radium (bare-tubes) X-ray			3 yrs.	10 mo.	3 yrs., 10 mo. Died
Ulcerating fibro-carcinoma No. 2307	Radium (bare-tubes) X-ray	Initial marked diminution in size. Ulceration over upper mass	Slow but progressive	14 mo.	20 mo.	34 mo. Died

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DIGEST OF CASES OF PRIMARY INOPERABLE

No.	Name	Age	MSW	Lact	Trauma	Date first symptom	First symptom	Date of admission	Condition on admission
16	M. F. (Janeway)	56	S	0	Yes	May 18	Pulling sensation, left breast, and one axillary node. Also mass in breast	May 19	Left breast seat of large mass 12 cm., fixed to deeper structures. Axillary and supraclavicular nodes. Also right axillary. Left arm considerably swollen
17	M. G. (Lee)	66	W	?	None	Sept. 16	Swollen red breast	Nov. 19	Left breast—firm, hard mass upper outer quadrant. Infraxillary, firm hard adherent mass. Axillary and supraclavicular nodes
18	A. H. (Janeway)	41	S	0	None	Jan. 18	Hard lump in right breast	July 19	Right breast entirely occupied by neoplasm firmly adherent to chest wall. Fungating cauliflower mass 8 cm. Axillary nodes
19	A. P. (Quick)	50	M	0	None	Dec. 18	Mass right breast. Ulceration soon	Apr. 19	Right breast contains rounded mass 5.7 cm. Ulceration fixed to deeper parts. Axillary nodes. Additional skin nodules over breast
20 U. S.	F. H. (Stone and Lee)	51	M	2	None	Aug. 18	Pimple, size of pea, outer quadrant right breast	Apr. 19	Right breast irreg. nodular mass, 6 cm. diameter. Fixed to deeper parts. Axillary and supraclavicular nodes
21 U. S.	C. M. (Quick)	42	M	?	None	Apr. 17	Tumor inner side left br., small nodule	Apr. 19	Solid tumor 2½ cm. lower inner quadrant left breast, fixed to chest wall. Few small axillary nodes. One supraclavicular node
22 Ire.	M. M. (Quick and Lee)	75	W	9	Yes	Aug. 14	Presence of mass in left breast. Later gripping sensation in breast	Aug. 19	Spherical mass, left breast 5×7×7. Many large axillary nodes and supraclavicular
23 Ire.	M. K. (Stone and Lee)	57	S	0	None	Apr. 14	Retraction left nipple. Ulcerated 2 years later	Apr. 19	Left breast, tumor 4×6. Fixed at deeper parts. Axillary and supraclavicular nodes
24 U. S.	G. P. (Janeway)	60	S	0	None	Jan. 1. Operation advised but refused at that time	Small skin indentation of left br.	Jan. 19	Left breast, enlarged hard globular mass outer ¼ Red cutaneous nodes. Large nodes in axilla and supraclavicular
25 Italy	A. S. (Quick and Lee)	65	W	4	None	Jan. 19	Little lump, upper outer quadrant, right breast.	July 19	Right breast, large mass outer lower quadrant 7×7 cm. Markedly inflamed. Several large axillary nodes. Breast mass ulcerating
26 U. S.	E. T. (Stone)	78	W	2	None	Nov. 18	Small nodule, left anterior axillary fold	Nov. 19	Left breast tail, tumor mass 5×4×2 cm. Slight fixation to deeper parts. Supraclavicular nodes (?). Axillary nodes
27 U. S.	A. Z. (Stone)	40	M	2	None	Aug. 18	Lump, left breast	Apr. 19	Left breast, hard mass 2×3 cm. Axillary and supraclavicular nodes

RADIATION OF CARCINOMA OF THE BREAST

CARCINOMA OF THE BREAST, TREATED 1918-1919

Path. type	Treatment	Result of treatment	Course	Duration up to admis.	Duration after admis.	Total duration with result
Diffuse carcinoma No. 2427	Radium. (Bare-tubes) in nodes in breast, X-ray	Some regression	Rapid (hemorrhage pneumonia)	1 yr.	8 mo.	1 yr., 8 mo. Died. Autopsy: Regressing mammary carcinoma diffuse retroperitoneal neoplasms plus
Solid infiltrating alveolar, car. (Edema necrotic areas and hydropic cells suggest X-ray effects. No. 1817 No path.	Palliative, removal br. Dec. 19 and radium into axillary mass. Skin grafting later	Marked neuritis along brachial plexus. No recurrence at site of breast removal	Nov. 20, 2nd lumbar vertebral metastases. Skin recurrence in scar	3 yrs.	1 yr., 6 mo	4 yrs. 6 mo. Died
	Radium. (Bare-tubes in breast and axillary node.) Tray. X-ray	Very marked local regression	Gen. condition continued good. Ulceration persisted	1½ yrs.	2 yrs., 9 mo.	4 yrs., 3 mo. Still alive —but confined to bed
Specimen removed but lost	X-ray	Progressively worse		4 mo.	1 yr.	1 yr., 4 mo. Died
	Radium. (Bare-tubes for left axilla.) X-ray	Marked regression of breast and axillary tumors	Developed left axillary mass. Later tumor in left breast also. Chest metastases	8 mo.	2 yrs., 6 mo.	3 yrs., 2 mo. Died
	Radium (pack)	Breast mass more movable, diminished in size. Axillary nodes smaller		2 yrs.	1 yr., 2 mo.	3 yrs., 2 mo.
	X-ray	Initial regression of breast, tumor and also breast mass became movable	Patient did fairly well for year and half. Then became poorer	4 yrs.	1 yr., 11 mo.	5 yrs., 11 mo. Died
	X-ray. Radium (bare-tubes in breast pectoral fold)	Considerable regression in breast mass 2 yrs. after beginning treatment; 13 skin recurrences around breast. About same time suspicious evidence of chest metastases	Ulcerating small area, appeared later over site of skin adherence. Coughing considerably. Presumably due to chest metastases	5 yrs.	3 yrs.	8 yrs. Still alive, though confined at home under Social Service care
	Radium (pack) (bare-tubes)		Developed spinal metastases	18 yrs.	1 yr., 8 mo.	19 yrs., 8 mo. Died
	X-ray Radium. (Bare-tubes right ax.) Palliative amputation. Skin grafting	No advance in axillary process. No other evidence of disease	Skin very bronzed from radiation. No radiation since operation	6 mo.	2 yrs., 9 mo	3 yrs., 3 mo. Still alive, doing very well. Weight on admission 105 lbs. Present weight 120 lbs.
	External application radium over breast. X-ray	Local regression tumor mass	Ulceration developed later. Chest signs suggest metastases	1 yr.	2 yrs., 5 mo	3 yrs., 5 mo. Still alive
	Radium. (Bare-tubes). X-ray	Local regression in breast and nodes	8 mo. 11 mo.	1 yr.	7 mo.	Died

BURTON J. LEE

DIGEST OF CASES OF PRIMARY INOPERABLE

No.	Name	Age	MSW	Lact	Trauma	Date first symptom	First symptom	Date of admission	Condition on admission
28 Eng.	A. B. (Lee)	48	S	0	0	July 18	Sharp pain right breast. Soon entire breast became hard	Oct. 20	Right breast large tumor 5x3 cm. Definite axillary nodes. Suprac nodes (?)
29	M. F. B. (Stone)	?	M	2	0	June 18	Tightening in left breast, near axilla. 4 mo. decided dimpling of skin in this area. Tumor	June 20	Tail left breast movable mass skin adherent, left arm swollen, suprac. nodes
30 U. S.	A. C. (Quick)	40	S	0	0	Apr. 20	Left breast little larger than normal. Discovered hard mass in it. Slight fixation, deeper structures	Sept. 20	Whole left breast involved. Axillary lymph-nodes
31 U. S.	C. De H. (Janeway)	54	S	0	Yes	Apr. 13	Small lump size marble, outer quad. right breast. (Excision advised. Refused.)	Jan. 20	Right breast retraction, mass 4x5x2, upper outer quad. Left breast also involved. Ulcerated nodular mass, 4x5x3 cm. Axillary nodes (?)
32 U. S.	M. D. (Lee)	53	S	0	0	Oct. 19	Small lump size marble, right breast ulcerated 1 mo. before admission	Oct. 20	Right breast huge, fungating cauliflower mass 10 cm. diameter, elevated 4 cm. Secondary cutaneous nodules. Left breast hard mass above nipple, 6 cm. diameter. Skin fixed. Marked nodes right axilla.
33 Col. U. S.	E. A. (Lee)	54	S	0	0	Mar. 18	Small hard lump, size of marble, in left breast	Nov. 20	Middle two-thirds left breast hard irregular mass, with brawny nodules. Fixed to deeper parts. Axillary nodes definitely involved
34 Aus.	A. E. (Lee)	73	W	8	0	Dec. 18	Small lump, rt. breast. Ulcerated 9 mo. before admission	Dec. 20	Large ulcerated mass right breast, axillary and suprac. nodes markedly involved, also left axillary nodes
35 Col. U. S.	T. C. (Lee)	73	W	1	0	Feb. 19	Small lump right breast, later sticking, burning pain	Dec. 20	Right breast, eczema nipple. In fold beneath breast ulcer, 2x6 cm. Underlying tumor fixed to muscle. Large node right ax. low down. Suprac. (?). Subcutaneous nodule, 3 cm. diameter, upper outer quadrant, right breast. Pagets
36	A. P. (Lee)	54	S	0	0	May 18	Nipple retracted. One yr. later small growth near nipple	May 20	Major portion of left breast occupied by irregular hard tumor, 10x8 cm. Nipple markedly retracted. Abrasion below it. Pigskin appearance, somewhat fixed. Hard, fixed axillary nodes
38 Aus.	B. G. (Lee)	42	S	0	0	Apr. 18	Small lump, size egg, left breast	Oct. 20	Left breast nipple missing. Ulcerated area 8 cm. diameter underlying nipple site with tumor mass beneath it. Markedly inflammatory. Adherent cutaneous masses in axill. Whole arm swollen

RADIATION OF CARCINOMA OF THE BREAST

CARCINOMA OF THE BREAST, TREATED 1918-1920

Path. type	Treatment	Result of treatment	Course	Duration up to admis.	Duration after admis.	Total duration with result
	X-ray	Mass definitely smaller. Axillary nodes disappeared Nov. 21. Small nodule in skin midway between nipple and axilla	This nodule developed 16 mos. after beginning treatment. Chest plate suggests ca. metastases	2 yrs., 3 mo.	1 yr., 6 mo.	3 yrs., 9 mo. Still alive, but in fair general condition
	Radium pack. Radium trays. X-ray	Local regression tumor in tail of breast markedly contracting	Later node developed in neck. Left axillary node small and movable	2 yrs.		
	Radium. pack. (Bare-tubes)	Regression of breast tumor	Right suprac. nodes present. Right breast involved, Oct. 21	5 mo.	1 yr., 7 mo.	2 yrs. Still alive, with disease held well in check
	Radium (Bare-tubes.) Radium pack, X-ray	Marked regression in size of breast. Pain diminished	Left arm became swollen Mar. 22, pt. being cared for at home	8 yrs., 9 mo.	2 yrs., 3 mo.	11 yrs. Still alive but not doing well
Infiltrating carcinoma. No. 3345	X-ray. Radium externally, palliative removal of breast, Dec. 20. Last X-ray Dec. 21, Skin grafted later	X-ray treatment of ulcerating right breast, diminished breast but not ulceration. Left breast size diminished	Feb. 19, 1922. Good general condition. Weighed 131 lbs. (On admission 120 lbs.) Few skin recurrences. Left breast no larger. Axillary nodes still present	1 yr.	1 yr., 6 mo.	2 yrs., 6 mo. Still alive, good general condition
Carcinoma simplex	Radium pack, X-ray	Breast tumor became more movable and diminished in size with less skin involvement	Nodes in both axillae	2 yrs., 8 mo.	1 yr., 5 mo.	4 yrs., 1 mo. Still alive, feeling well
Carcinoma simplex No. 3597	X-ray	Very little result noted from X-ray treatment, arm swollen	Disease held in check for short time; then steady advance of disease	3 yrs.	16 mo.	4 yrs., 4 mo. Died
Fibrocarcinoma invading epithelioma of skin No. 3256	X-ray	Ulcerated area much smaller. Breast mass smaller	Patient in excellent general condition. No increase local disease. Chest negative	22 mo.	17 mo.	3 yrs., 3 mo. Alive, feeling very well
Alveolar carcinoma, probably sweat-gland type, very cellular No. 3913 No. 2534	Radium B.T., Pack, X-ray. Palliative removal ulcerated breast under novocaine	Ulceration of skin over breast Diminution in size of breast. No increase in size of nodes	Patient has continued to do well. Chronic nephritis with high tension	2 yrs.	1 yr., 11 mo.	3 yrs., 11 mo. Alive, doing well
Small alveolar carcinoma probably duct type. No. 3025	X-ray	Local regression of tumor	One yr. after treatment evidence involvement left pleura	2½ yrs.	1 yr., 5 mo.	3 yrs., 11 mo. Died

BURTON J. LEE

DIGEST OF CASES OF PRIMARY INOPERABLE

No.	Name	Age	MSW	Lact	Trauma	Date first symptom	First symptom	Date of admission	Condition on admission
39 Rus.	L. H. (Lee)	70	W	7	Yes	Mar. 19	Small lump, right breast	July 20	Marked enlargement whole right breast. Diffuse blushing of skin lower half. Tumor adherent chest wall
40 Aus.	G. H. (Lee)	55	M	5	o	1897 Dec. 19, began to increase in size	Small lump, size hazelnut left breast	Feb. 20	Nearly whole left breast of tumor. Fixed at deeper parts. Large axillary mass nodes fixed. General condition good
41 Ire.	C. M. (Lee)	43	M	0	o	May 13	Lump, size egg, outer side, left breast	May 20	Hard mass, running from left nipple outward, 5 cm. One large hard movable node in axilla. Over middle of sternum fixed hard mass 13 cm. long, 5 cm. wide, raised 3 cm.
42 Ire.	A. McC. (Lee)	47	S	0	o	Mar. 10	Small lump, left breast	Mar. 20	Large, hard tumor lower part left breast 50 cm. Adherent chest wall. Redness. Axillary nodes marked. Supraclavicular nodes
43 U.S.	L. McG. (Lee)	51	S	0	o	Feb. 19	Swelling in left axilla	Feb. 20	Whole left breast diffusely infiltrated with tumor condition giving hard large massive breast fixed to chest. Ax. and 3 suprac. nodes
44 Rus. Jew	S. M.	52	W	7	Yes	July 18	Small lump size bean in right breast after trauma	July 20	Mass medial section of breast above nipple 2x3x3 cm. One hard node in axillary region, one in suprac. Weight 110 lbs.
45 Ire.	M. M. (Lee)	38	M	4	No	Jan. 20	Small lump, size walnut outer portion right breast	Apr. 20	Whole right breast involved with tumor mass 10x7x2. Large hard axillary nodes, several suprac. nodes
46 Italy	M. M. (Lee)	43	M	9	o	Apr. 19	Small lump (hazelnut) right breast	July 20	To right and above right nipple a regular ulcer 2x4 cm. Surrounding skin inflamed tender, underlying induration. Large nodes both axillae. One suprac.
47 Ire.	M. N. (Lee)	60	S	0	o	Dec. 16	Small lump right breast	Nov. 20	Right breast lateral to nipple dense and fibrous in skin and involving breast tissue beneath. Adherent to muscle. One node right axilla. Also nodes right supraclavicular
48 U.S.	M. O'C. (Lee)	58	S	0	Yes	Sept. 18	Following trauma left breast scarlet. Shortly after left nipple retracted and red	Sept. 20	Primary in left breast (?) Both breasts swollen oedematous. No definite tumors can be felt except firm tissue beneath nipple. Entire chest and upper abdomen covered by reddened, thickened <i>en cuirasse</i> . Left supraclavicular
49	M. R. (Stone, Lee)	48	S	0	Yes	Dec. 18	Left breast began to get hard and swollen	July 20	Entire left breast hard and indurated. Nipple ulcerated. Surrounding skin like orange peel. Mass fixed. Large axillary nodes. Some suprac.

RADIATION OF CARCINOMA OF THE BREAST

CARCINOMA OF THE BREAST, TREATED 1918-1920

Path. type	Treatment	Result of treatment	Course	Duration up to admis.	Duration after admis.	Total duration with result
Carcinoma simplex No. 2842	Radium bare-tubes in breast tumor	Local regression	Rapid as was expected from blushing of skin. Later involvement right pleura	1 yr., 3 mo.	8 mo.	1 yr., 11 mo. Died.
Carcinoma simplex No. 3313 No. 3465	Radium packs, X-ray. Later breast removed by Strobell method	Initial marked diminution size of tumor. Later rapid growth with cutaneous metastases and ulceration	Toward end very rapidly progressing	6 wks.	16 mo.	17½ mo. Died June 22, 1921
Small alveolar duct carcinoma No. 2487	Radium tray. Bare-tubes in axillary, mass and breast tumor X-ray		Case difficult to follow	7 yrs.	13 mo	Last available note June 21. Patient in fair shape then. 8 yrs., 1 mo., plus
Cellular carcinoma. No. 3582 Fibrocarcinoma, probably sweat-glands No. 2346	Radium pack. Bare-tubes in breast and axillary X-ray	Immediate result satisfactory regression	Slow progression of disease	2 yrs.	2 yrs.	4 yrs. Died Mar. 6, 1922
Fibrocarcinoma No. 2296	Radium pack. Radium B.T. X-ray	Marked regression in size of tumor	Excellent condition for 1 yr., 3 mo. Rapid progression of symptoms after that time. Extensive ulceration of breast	1 yr.	2 mo.	1 yr., 2 mo. Still alive, confined to bed at home. Last note Apr. 10, 1922
Carcinoma simplex No. 2344. From breast	Radium packs, Radium trays, Radium bare-tubes. In breast and axilla. X-ray-last treatment Feb. 21, 1922	Tumor in breast has disappeared. Nodes still present in axilla	Excellent. No advance of disease. Now weighs 143 lbs. Gained 33 lbs.	2 yrs.	22 mo.	3 yrs., 10 mo. Still alive
Carcinoma simplex No. 4572	X-ray	Local regression from tumor mass	Left breast later involved. Abdominal metastases	3 mo.	16 mo.	1 yr., 7 mo. Died Aug. 17, 1921
	X-ray palliative removal breast by outside surgeon		No progression of disease	15 mo.	22 mo	3 yrs., 1 mo., Patient doing very well with no apparent advance of disease
Carcinoma simplex No. 3710	Radium back. Radium trays, Radium bare-tubes. Platinum needles. X-ray	Marked local regression for little over year. Ulceration Feb. 22, following Bare-tubes	Slow. Probable mediastinal metastases. General condition still fair	4 yrs.	2 yrs., 5 mo.	6 yrs., 5 mo. Still alive, general condition fair. Small ulcerated area over breast. Daily dressings
Carcinoma simplex No. 2976	X-ray	Almost complete disappearance of red induration in skin. Breasts markedly regressing in size	Broke left femur Sept. 21. Cannot obtain evidence as to presence of metastases	2 yrs.	1 yr., 7 mo.	3 yrs., 7 mo. Still alive. Doing fairly well. Last note March 3, 1922
Fibrocarcinoma sweat-gland type (?)	X-ray	Marked contraction size of breast	Later ulceration—right breast later involved	7 mo.	18 mo.	2 yrs., 1 mo. Died Jan. 20, 1922

BURTON J. LEE

DIGEST OF CASES OF PRIMARY INOPERABLE

No.	Name	Age	MSW	Lact	Trauma	Date first symptom	First symptom	Date of admission	Condition on admission
50 U.S.	M. W. (Lee)	53	S	0	Yes	July 19	Small lump right breast	Mar. 20	Upper inner quadrant right breast, completely filled with firm tumor 10 cm. diameter. Mass is fixed. Numerous skin nodules. Axillary nodes
51 Ger.	A. H. (Lee)	55	M	4	Yes, indefinite history	Sept. 19	Small mass size of pea rt. breast. Ulceration wks. before admission	Sept. 20	Right breast larger tumor, inner half. Deep crater-like ulceration. Axillary nodes moderately large. Few suprac.
52 U.S.	A. O'N. (Lee)	52	M	0	0	Jan. 20	Small lump, size bean, left breast	Sept. 20	Left breast large tumor 18 cm. diameter. Ulceration 12 cm. fungating mass. Large left ax. nodes and supraclavicular nodes. P. anemic and emaciated
53 U.S.	A. R. (Lee)	65	W	0	0	Feb. 19	Small lump, right br. to outer side of nipple. Size of marble	Mar. 20	Almost entire right breast infiltrated by diffuse hard mass which began close to nipple. Markedly fixed to deeper structures. Extends toward axilla. Infiltration axillary and suprac. nodes on right. Right arm swollen 2½ cm. diameter over left
54 Ire.	A. H. (Lee)	50	S	0	0	Aug. 18	Small growth left breast near axilla. Increase in size began 1 yr. later	Feb. 20	Upper outer quadrant, left breast involved in to hard tumor, running into tail. Mass fixed. Nodes both axilla. Slight ulceration
55 U.S.	L. G. (Stone)	47	M	3	Yes	July 13	Following trauma, noticed small lump right breast	June 20	Right breast has raised nodular neoplastic ulceration, 6 cm. diameter. Nipple destroyed. Hard node rt. axilla. One supraclavicular node
56 Ger.	M. S. (Lee)	53	S	0	Yes	Aug. 20	Small lump upper inner quadrant right breast	Aug. 20	Lower inner quadrant right breast mass 10 to 15 cm. Right axilla, left axilla, and suprac. nodes
57 Bohemia Male	O. K. (Stone)	44	M		0	July 19	Noticed mass, size egg, overlying left chest	Mar. 20	Numerous hard red nodules in skin about nipple. Firmly fixed tumor tissue lying about nipple. Enlarged nodes both axilla and scars
58 U.S.	M. A. (Quick)	53	M	6	Yes, 1 yr.	Nov. 17	Presence of lump in tail of breast	Nov. 18	Entire right breast red, almost ulcerating. Both axilla and suprac. nodes. Cerebral lesion
59 Sweden	H. B. (Janeway)	40	M	5	No	Nov. 16	Breast enlarged and hard during lactation	Mar. 18	Right breast large, hard, somewhat fixed. Axillary and supraclavicular nodes. Chest plate suggestive. Positive?
60 U.S.	K. C. (Quick)	42	M	?	No	6 mo.	Breast red, hard, and swollen	Nov. 18	Whole left breast very large and red. Large nodes in axillary and supraclavicular regions
61 U.S.	E. P. (Quick)	?	W	?	?	?		Aug. 18	Tumor upper outer quadrant left breast. Axillary nodes ulcerated. Supraclavicular nodes, 3rd lumbar vertebra

RADIATION OF CARCINOMA OF THE BREAST

CARCINOMA OF THE BREAST, TREATED 1918-1920

Path. type	Treatment	Result of treatment	Course	Duration up to admis.	Duration after admis.	Total duration with result
Fibrocarcinoma No. 2212	Radium pack. X-ray	Marked diminution in size breast. Also became more movable. Axillary mass diminished	Axillary mass almost disappeared	9 mo.	8 mo.	1 yr., 5 mo. Died Nov. 20, 1920, at home. Reported by M.D. to be an intrapleural hemorrhage
	X-ray. One cycle	Slight regression size breast tumor	Further follow-up impossible as pt. would not return to hospital	1 yr.	1 yr., 3 mo.	2 yr., 3 mo. Last note Dec. 28, 1921, by Social Service. Pt. under care private physician
Large alveolar ca. Probably sweat-gland type. No. 3054	Radium trays. Radium bare-tubes. X-ray. Oct. 16, 1920. Palliative removal foul ulcerating br. Later grafting		Rapid progression in metastases upper wall of orbit. Pleura in lungs. Later abdominal metastases	8 mo.	9 mo.	1 yr., 5 mo. June 14, 1921
Alveolar carcinoma No. 2239	Radium pack. Radium trays. Radium bare-tubes. X-ray	Marked diminution in size of breast. Later ulceration, small	Ulceration has diminished considerably. No extension of disease. General condition excellent	13 mo.	25 mo.	3 yrs., 2 mo. Still alive in very good condition. Weight on admission 146 lbs. Present weight, 152 lbs.
Carcinoma simplex No. 2345	Radium bare-tubes. X-ray	No advance of disease for about 10 mo. then ulceration	Tumor mass became red and inflammatory Gen. condition failed. Later abdominal metastases	18 mo.	16 mo.	2 yrs., 10 mo. Died June 5, 1921
	Radium externally. X-ray	Some regression in breast and nodes	Ulceration continued. Cerebral Numerous rib metastases. Feb. 21	7 yrs.		Last note, April, 1921
Cellular plexiform carcinoma No. 3704, No. 3561 (axilla)	Radium bare-tubes in breast tumor. X-ray. Palliative removal of breast Skin grafting	Initial, some diminution in tumor but reddened with threatening ulceration. Nodes diminished in size	Gen. condition excellent. No obvious disease. Initial weight 124 lbs. Now weighs 146 lbs.	1 yr.,	1 yr., 8 mo.	1 yr. 18 mo. Alive, splendid condition
Schirrhous carcinoma (Mt. Sinai)	X-ray		Developed chest metastases in both bases	8 mo.	16 mo.	2 yrs. Died July, 1921
	Radium pack X-ray	Some local regression	Steadily downward	1 yr.	9 mo.	1 yr. 9 mo. Died
	Radium pack.	Nothing accomplished generally but definite local regression	Steadily worse	16 mo.	4 mo.	20 mo. Died
	X-ray	Breast diminished redness less marked, mass more movable	Developed chest metastases	6 mo.	5 mo.	11 mo. Died
	Radium pack. X-ray		Rapidly became worse	?	3 mo.	? Died

BURTON J. LEE

DIGEST OF CASES OF INOPERABLE

No.	Name	Age	MSW	Lact	Trauma	Date first symptom	First symptom	Date of admission	Condition on admission
62 U.S.	R. G.	35	M	?	o	June 18	Growth upper part left breast	Dec. 18	Both breasts, left ulcerating. All regional glands
63 U.S.	A. L. (Janeway)	68	M	5	?	Feb. 18	Discovered small lump left breast	July 18	Left breast large, 10 x 10 cm. hard mass, fixed to muscle. Some axillary nodes. Fluid both chests
64 U.S.	L. McI. (Janeway)	66	M	?	Yes, 2 mo.	Sept. 17	Small lump left breast	Dec. 18	Large, ulcerating tumor left breast. Edema of legs. Retention of urine. Spinal metastases
65 Ire.	E. S. (Janeway)	48	M	7	Yes	May 17	Tumor in right br. size of walnut	Jan. 18	Entire right breast involved. Mass 16 x 9. Axillary and supraclavicular nodes
66 U.S.	E. C. (Quick)	45	M	4	o	Oct. 18	Mass size of egg above nipple, right breast	Apr. 19	Right breast very enlarged, 15 cm. Tumor throughout reddened. Fixed to muscles. Many small nodes in both supraclavicular regions and axilla
67 Ire.	S. C. (Lee)	76	W	?	o	Dec. 17	Small nodule, size of marble, outer quadrant, left breast	Dec. 19	Left breast completely replaced by bluish-purple ulcerated mass, hard. 12 x 14 x 4 cm. Axillary nodes. Also rt. axilla
68 U.S.	M. LaV. (Quick)	69	W	5	Yes	Mar. 11	Small spot right breast, site of an old injury. Quite firm, not painful	Mar. 19	Has lost much weight. Cauliflower tumor, right breast, 10 x 7 cm. Very fixed. Large, firm axillary nodes. Hard firm mass in abdomen to left of umbilicus
69 Rus. Jew	A. L. (Stone and Bailey)	54	M	o	o	Apr. 19	Hard nodule, 2 x 4 cm., in right axilla. Node removed from right axilla 3 mo. ago by Dr. Berg	July 19	Tumor right breast, 4 cm. Fixed to deeper parts. Axillary nodes. General condition poor. Also adenocarcinoma of uterus
70 U.S.	R. McL. (Lee)	31	M	3	o	Dec. 19	Sudden pain in right breast. Nursing baby 7 mo. old. Had refused to nurse for 5½ months	Dec. 19	Pt. jaundiced. Has large liver. Right breast contains tumor, 8 x 7 cm. 2 nodes in axilla
71 Ger.	R. B. (Lee)	47	M	7	o	Oct. 19	Small lump, lower part left breast. Ulcerated 2 mo. ago	Aug. 20	Lower outer quadrant, left breast indurated tumor about 6½ cm. diameter. Ulcerated. Left axillary node involved, also supraclavicular. Condition suggests epithelioma
72 Italy	M. B. (Lee)	50	M	1	o	Mar. 20	Lump, size of egg, left breast	Sept. 20	Left breast large mass 6 x 7 cm. Nodes in both axillae and left supraclavicular. Chest metastases
73 Col. U.S.	M. B. (Lee)	30	S	o	Yes	July 20	Pain right arm. Shortly after lump, size Eng. walnut, right breast	Oct. 20	Right breast large mass ulcerating 10 x 10 x 10 cm. Large mass axillary node. Supraclavicular nodes (?)
74 U.S.	L. S. C. (Lee)	35	W	1	Yes	Feb. 19	Small lump right axilla. Gradually spread toward breast	May 20	Tumor mass right breast above nipple out to axilla 7 x 4 cm. Bluish discoloration. Large hard nodes, axillary. Not fixed. Chest plate carcinoma metastases. Marked anemia. Left axillary nodes
75 U.S.	D. G. (Quick)	60	S	o	o	Sept. 5, Stationery until Sept. 16	Lump, size pea, left breast	Sept. 20	Largestony hard tumor upper outer quadrant, left breast. Freely movable under skin. Hard node left axilla. Metastases 7 and 8 dorsal vertebrae

RADIATION OF CARCINOMA OF THE BREAST

CARCINOMA OF THE BREAST, TREATED 1918-1920

Path. type	Treatment	Result of treatment	Course	Duration up to admis.	Duration after admis.	Total duration with result
Very cellular carcinoma No. 1473	X-ray	?	Very rapid	6 mo.	2½ mo.	8½ mo. Died
	Radium bare-tubes. X-ray	Some diminution breast tumor	Progressively worse	5 mo.	5 mo.	10 mo. Died
	Radium pack		Rapidly worse. Irrational	15 mo.	6 wks.	16½ mo. Died
	X-ray		Rapid	8 mo.	2½ mo.	10½ mo. Died
	X-ray		Disease progressive	6 mo.	8 mo.	1 yr. 2 mo. Died
	Never treated		Cared for by social service department	2 yrs.	1 yr. (?)	3 yrs. Probably dead
	X-ray	?	Rapidly worse	8 yrs.	7 mo.	8 yrs. 7 mo. Died
Alveolar carcinoma No. 1866	Radium for uterus. Bare-tubes for breast. X-ray		Rapidly worse	3 mo.	2 mo.	5 mo. Died
	Never treated		Patient grew rapidly worse	2 wks.	7 wks.	9 wks. Died
	X-ray. Two cycles		Steadily downward	10 mo.	5 mo.	1 yr. 3 mo. Died
	X-ray		Nov. 21. Skull metastases	6 mo.	5 mo.	11 months. Died
Malignant partly necrotic tumor. Type uncertain. Very cellular. Grows like epithelioma	X-ray. Palliative removal of foul ulcerating breast by cautery Feb. 5, 1921	Increase of ulceration	Rapidly downward. Fairly clean ulcerated area where breast has been removed	3 mo.	7 mo.	10 mo. Died
Large alveolar carcinoma No. 2482	None		Rapid	15 mo.	2 wks.	15 mo. 2 wks. Died
	Radium packs (breast and spine). Radium bare-tubes for breast. X-ray	Regression in breast tumor	Very rapid	4 yrs.	3 mo.	4 yrs. 3 mo. Died

BURTON J. LEE

DIGEST OF CASES OF PRIMARY INOPERABLE

No.	Name	Age	MSW	Lact	Trauma	Date first symptom	First symptom	Date of admission	Condition on admission
76 Aus. Jew	S. K. (Lee)	42	M	6	o Now 7 mo. pregnant	Jan. 20	Lump, size marble, in right breast	May 9.	Right completely occupied by tumor mass, hard, fixed to deeper structures. Breast markedly tender. Slightly inflammatory. No palpable nodes. Metastases left scapular
77 Ger.	W. L. (Lee)	42	W	1	o	June 13	Small lump, left breast, size hazel-nut, following weaning of baby. Stationary until 2 mo. ago	June 20	Entire left breast replaced by hard fixed ulcerating tumor extending up to axilla. Numerous hard cutaneous nodules, axillary and suprac. nodes. Pt. looks ill. Temperature 101½. Chest plate not definite carcinoma
78 U.S.	C. L.	22	M	0	o	June 20	Small lump, size of marble, left breast, incised by physician 2½ mo. ago	Nov. 20	Left breast markedly swollen, inflamed, ulcerated, adherent to chest wall. Numerous axillary and supraclavicular nodes. Extensive involvement left pleura. No data as to whether at present pregnant. Left arm swollen
79 Ire.	M. McK. (Lee)	41	M	2	o	Aug. 20	General enlargement of whole right breast, tumor 10x10x8 cm. Nodes in both axillae. Also right supraclavicular	Sept. 20	Small node right side neck with skin adherent to it. Also tumor in left breast. Right pleural involvement with fluid. Pt. operated for carcinoma of stomach, March 20
80 Italy	L. M. (Lee)	40	M	3	o	Mar. 20	Asthma, 3 mo. later noticed retraction of nipple over upper inner part of breast	Sept. 20	Marked difficulty in breathing. Anemic. Lost great deal of weight. Left breast large mass 5x18 cm. involving lower portion of breast. Axillary nodes (?) Signs fluid right side chest. (Carcinomatous metastases)
81 Ger.	P. S. (Germany)	63	M	5	o	Sept. 20	Shooting pain right breast, 2 mo. later a small lump noticed	Dec. 20	Large mass right breast 12x12 cm. Fixed. Surface reddened. Beginning to ulcerate. Both axillary nodes markedly involved. Also supraclavicular, right. Two small subcutaneous nodules
82 U.S.	R. W. (Bailey and Lee)	73	W	2		Sept. 13	Slight mass in left breast	Sept. 20	Left breast entirely filled with tumor mass which is inflamed and fixed. Nipple destroyed by ulceration. Axillary supraclavicular and lymph-nodes. Advanced chest metastases left side
83 U.S.	C. A. (Lee)	64	W	?	?	1898	Small mass size of pea in the right breast	Mar. 20	Large fungating mass involving whole right anterior chest wall running across somewhat to left side. almost into right axilla. Right arm swollen considerably. Left nipple is out of ulceration which almost completely hides nipple. Numerous cutaneous nodules over skin right side of back. Considerable mass right supraclavicular region

RADIATION OF CARCINOMA OF THE BREAST

CARCINOMA OF THE BREAST, TREATED 1918-1920

Path. type	Treatment	Result of treatment	Course	Duration up to admis.	Duration after admis.	Total duration with result
	Radium pack 8064 mc. at 6 cm. inner part breast. Same to outer	Patient did badly from time of radiation	Almost immediately fatal	4 mo.	1 wk.	4 mo. 1 wk. Died May 15, 1920
Carcinoma simplex No. 2564	X-ray	Marked contraction size of breast	Rapid chest metastases early	9 yr.	3½ mo.	9 yr. 3½ mo. Died Sept. 25, 1920. Autopsy showed metastases into opposite breast and axilla, pleura, lungs, liver, coeliac nodes, bones, and ovaries
	No treatment		Rapid progression	6 mo.	2 wks.	6½ mo. Died Nov. 30, 1920
Fibrocarcinoma No. 2995	X-ray		Rapidly fatal	6 mo.	3 wks.	6 mo. 3 wks. Died Oct. 18, 1920
Section from node above clavicle no carcinoma No. 2975	Radium pack. X-ray	Primary regression	Chest symptoms became rapidly worse. Signs on both sides. Large mass right axilla. Mass section 2nd rib with sternum	6 mo.	6 mo.	1 yr. Died Mar. 16, 1921
	X-ray		Growth tumor very rapid. Mediastinal involvement	3 mo.	2 mo.	5 mo. Died Feb. 21
	X-ray (2 treatments for moral effect on pt.). Radium pack		Rapidly worse	7 yrs.	6 mo. ?	7 yrs. 6 mo. Died at home
Alveolar carcinoma. Probably sweat-gland	No treatment		Most unusual course. Complete history of disease extending over 22 yrs.	22 yrs.	5 mo.	22 yrs. 5 mo. Died at House of Calvary.

END RESULTS OF OPERATIONS FOR CARCINOMA OF THE RECTUM*

BY DANIEL FISKE JONES, M.D.

AND

LELAND S. McKITTRICK, M.D.

OF BOSTON, MASS.

THE technic of operations for malignant disease appeared to be quite definitely standardized many years ago, that is, the growth with a wide margin of healthy tissue was excised en bloc with as large an area as possible of lymphatic drainage. For some reason or other, many surgeons did not apply this technic to carcinoma of the rectum, preferring a local excision of the growth, or an excision of the growth by a very narrow margin, making every effort to leave the sphincter muscle.

Undoubtedly the statistics from Vienna, reported by Hausmann, had considerable influence on the type of operation, for he stated that of one hundred and twelve cases of carcinoma of the intestines which came to autopsy, in fifty-five the disease remained localized in the bowel wall. Undoubtedly the dread of an extensive operation in this region also had some influence, as did also the fact that surgeons were occasionally surprised to find that a patient had unexpectedly lived for ten or twelve years after a local excision. The attitude of surgeons from 1911 to 1920 is best shown by these quotations: Mr. Edwards, before the Royal Medical Society in 1911, said: "My chief object is to enter a protest against the performance of an unnecessarily severe operation with a heavy mortality, in cases attended with little risk to life, and which moreover entail no crippling of the patient." He further says: "I cannot agree with those who advocate the abdomino-perineal method, any more than with those who for a small limited carcinoma of the breast would remove all but the ribs."

Mr. F. T. Paul, in the *British Medical Journal* of 1912, is reported as saying: "Why should we undertake an extensive excision of the mesentery for the removal of glands which in all probability are not infected?"

In spite of the fact that a few surgeons never approved of an extensive operation for carcinoma of the rectum, there has been definite progress toward the more extensive operations, until within the last two or three years, since when there has been a definite backward step. It is very discouraging to read such a statement as that by Mr. Herbert H. Brown, made at the meeting of the British Medical Association in 1920. He said: "But I can assure you that a considerable proportion of the patients upon whom I have operated, generally by the Kraske method, during the past fifteen years, are alive and in good health. I have been much struck by the comparative freedom

* Read before the American Surgical Association, May 1, 1922.

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from recurrence in cases of cancer of the bowel after operation. I feel it a great advantage to retain the external sphincter if possible."

It is still more discouraging when a man like Lockhart-Mummery states that he has given up the abdomino-perineal operation except in high carcinomata at the recto-sigmoid junction.

Other well-known surgeons have recently recommended local excision or excision followed by end-to-end suture. In other words, there are certain surgeons who still believe that carcinoma of the rectum always, or nearly always, remains localized in the bowel, and therefore an extensive operation is not necessary. This group of men is probably influenced by the occasional case which lives for ten or twelve years after a local excision, and by Hausmann's statistics from Vienna; they certainly could not have looked up the end results of all the cases seen by them. We might very reasonably ask of them what a small limited carcinoma is, which Mr. Edwards speaks of? How do we know it and how is it possible to tell whether the regional glands or peri-rectal tissue are involved or not? We might better remove too much in a very occasional case than too little most of the time.

A second group believes, but does not give us any proof, that the posterior operation gives as good late results and a much lower immediate mortality than the abdomino-perineal operation. But the only statistics of any value are those for the posterior operations of some years ago. When several large groups showed that 16 per cent. lived three years, and that the operability was about 25 per cent., these figures do not compare favorably with an operability of 60 per cent. and 46 per cent. of three-year "cures," even though the mortality is lower. The mortality in the posterior operation as recently given by Lockhart-Mummery was 5 per cent., while Crile reported twenty cases without a death.

A third group, which is most persistent, states that as much intestine can be excised from below as from above. This may be granted, but what is of importance is that it is impossible to remove more than a small part of the peri-rectal fat and mesentery except in a very few favorable cases. It is time that this fallacy should be disposed of for all time. If it is not necessary to remove peri-rectal fat and mesentery, it may be granted that all that it is necessary to remove may be removed posteriorly. It is possible, we believe, to settle all these questions by statistics.

We believe that it is the greatest importance to consider carefully these statistics of Hausmann, which state that in patients dying of carcinoma of the intestines, but 50 per cent. of them show any growth outside of the bowel wall. This means that if we could find some method of removing the growth by a narrow margin without implanting the cells in the surrounding tissue, we would be able to cure permanently 50 per cent. of all cases seen by us; but what are the facts?

Up to 1915 several large groups of cases operated upon by the posterior route showed that probably not over 25 per cent. of the cases seen were

operated upon, and after this careful selection there was a mortality of 16 per cent., and of those surviving the operation, but 16 per cent. lived three years; that is, about 4 per cent. of the patients seen lived for three years, instead of 50 per cent. being permanently cured, as should be if Hausmann's observations are correct.

If we consider the Sir Harrison Cripps' series, which is the best for the posterior route that I know of, we find that 9 per cent. of the total number seen were alive three years later.

If we now consider the most extensive operation the one coming nearest the ideal, that is, the combined abdomino-perineal operation of Miles, in which there is no possibility of implantation of cells directly from the growth, we find that 22.7 per cent. of the total number seen will be alive at the end of three years, and 11.3 per cent. at the end of five years. It will be seen that while this is a great improvement over the posterior operation, this number is far below the 50 per cent. of permanent cures which Hausmann's statistics lead us to believe should be our goal. As it is impossible to implant cells by direct contact with the growth in the one-stage abdomino-perineal operation, we are forced to the conclusion that we scatter cells through the lymphatics, beyond the field of operation in 39 per cent. of the cases operated upon, or Hausmann's observation is not correct. If Hausmann's statement is correct, it is a severe indictment of our present method of operating, and we must begin at once to change our technic in order to make it possible to avoid the dissemination of cancer cells. It is our opinion that Hausmann's statement is not entirely correct, for we believe that cells were already scattered about at the time the autopsies were made, but were not found by him, for in the cases operated upon in which no metastases were found the recurrences are not evident in many cases for one, three, five, or even more years.

If with the most extensive operation we can do we can only have 11.3 per cent. of the patients seen by us walking about the streets at the end of five years, how can we take any interest in remarks such as I have quoted above by Mr. Brown, who has a "considerable portion" of the patients operated upon by him in the last fifteen years, walking about the streets at the present time?

Is it not time that the value of various operations should be determined definitely by figures rather than by the impressions of surgeons, which are admitted by everybody to be particularly fallacious? Because some surgeon decides to do a perineal operation in the great majority of cases, and states that he *thinks* the late results are as good as in the abdomino-perineal operation, it is not necessarily so. If the results are as good, then he must have improved very much upon any posterior operation which had been done previously.

Those surgeons who believe in local excision, those who believe in leaving the sphincter, those who believe in resection by a narrow margin and end-to-end suture, and those who believe in the posterior operation not as occasion-

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ally necessary, but as the operation of choice, should give us the proportion of cases operated upon to those seen, and their end results, for they have all been done enough times to give us definite knowledge as to the late results.

We hold no brief for any particular operation, but we do feel that it is the duty of surgeons who are doing this work to look to the end results and not merely to the immediate mortality. What we want is the operation that will give us the largest number of living patients at the end of three or five years out of the total number seen. It seems to us that any operation is of very little value, no matter how low the immediate mortality is, if but 25 per cent. of the cases seen can be operated upon. We should not advise an operation which preserves the sphincter and gives but a year of relief, for it is well known that patients soon accustom themselves to a colostomy, and an extensive operation with a colostomy gives a much longer period of relief.

It makes very little difference what Hausmann says about the localization of the growth in the intestine, nor does it make any difference what Mr. Edwards, Mr. Paul, or Mr. Brown says, the hard fact remains that we are able to operate upon not more than 65 per cent. of the cases seen, and that but 11.3 per cent. of the total number are alive five years later, even with an extensive operation. It is also true, we believe, that not over 2 per cent. of all are alive ten years later. The facts are about the same as Doctor Bloodgood expresses them about carcinoma of the breast: "They are all dead, that is certain, no matter what they died of."

Before we consider any operation, it is well to get all possible facts in regard to the lymphatic drainage of the rectum. Probably the most reliable and comprehensive description of the lymphatics is that of Mr. Ernest Miles, who divides them into three zones. (1) Zone of downward spread; that is, the perineal skin, ischio-rectal fat, and external sphincter. (2) Zone of lateral spread, which includes the levators, retro-rectal lymph-nodes, those in relation to branches of the internal iliacs, prostate, base of bladder, posterior vaginal wall, and base of broad ligaments. (3) Zone of upward spread, that is, the peritoneal floor of the pelvis, pelvic mesocolon, paracolic lymph-nodes, and a group of glands at the bifurcation of the left common iliac artery. These zones were mapped out by Miles from recurrences following four series of cases, the operation in each succeeding series being more extensive than in the preceding. It is the zones of upward and downward extension of Miles which are of the greatest importance in determining the operation to be advised. If we accept Miles' work on the lymphatic involvement in cancer of the rectum, and we believe it is the most convincing work that has been done, there will be very little difficulty in determining the type of operation best suited for the removal of carcinoma of the rectum. This means the removal of the main lymphatic channels, which follow the course of the superior hemorrhoidal and inferior mesenteric arteries, and a complete dissection of the pelvis. This can only be done by an abdominal operation. It also means that the sphincter, ischio-rectal fat, levators, and peri-rectal fat must be removed,

which can be done through a perineal incision. This means a permanent colostomy. The ideal operation, therefore, is a combined abdomino-perineal operation in one stage. While this is the ideal operation we believe that it is impossible to use it in all cases, because of the high mortality in certain groups. We must, therefore, depart from the ideal to whatever extent is necessary to accomplish removal of the growth, and keep out immediate mortality within reasonable limits.

An operation which we consider next in severity to the above operation is the abdomino-perineal operation in two stages. The high mortality in the two-stage abdomino-perineal operation as given in the appended table is largely due to our firm belief, that this operation could be done by sectioning the sigmoid, infolding the distal end and placing it below the peritoneal flaps at the first operation. We found that it made no difference how carefully the distal end was turned in, there was infection about it at the second operation, and in a large proportion of cases the infection caused a fatal peritonitis. After repeated efforts and changes in technic, the operation was given up and the two-stage operation described by one of us in 1915 was again taken up with much lower mortality. The abdominal portion of this operation is carried out exactly as in the one-stage operation, except that the bowel is not sectioned. Instead the upper sigmoid or lower descending colon is brought into the abdominal wound for a lateral colostomy. The arches of the sigmoidal vessels are carefully preserved in order to supply the portion of bowel below the colostomy. The rectum, and greater portion of the sigmoid with its mesentery, are placed in the pelvis and covered with peritoneal flaps. Five days to one week later, the rectum is removed from below, as in the one-stage operation, after the sigmoid is clamped, sectioned and infolded at the peritoneal floor.

This operation is one of great value in cases of partial obstruction in patients over sixty years of age, in the feeble, and in the fat patients, especially men. The objections to it are the discomfort of two operations, and a somewhat prolonged convalescence, but perhaps the most important objection to it is the dissection of the pelvis, freeing up of the growth, and leaving the growth *in situ* for several days. Implantation of cells might be expected to take place, but our statistics seem to show that the duration of life is about as long after the two-stage as after the single-stage operation, as will be shown later.

As many cases are too feeble, too much obstructed, too fat, or too old, to withstand successfully an abdomino-perineal operation of either one or two stages, the operation used by Lockhart-Mummery recently, that is, a colostomy without any dissection above, followed some days or weeks later by amputation of the rectum by the perineal route, has been found of great value. The mortality is low, 5 per cent. in the hands of Mr. Lockhart-Mummery.

A fourth operation which we use only very occasionally is an abdomino-perineal operation in one stage, in which the sphincter is retained and the end of the sigmoid is pulled down through the sphincter muscle after resection

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of the growth. We believe that this operation should be chosen only occasionally, for we believe that the percentage of recurrence will be higher, and the chance of failure to obtain a useful sphincter good. We have used the operation but eight times with 50 per cent. of failures.

A fifth operation which we have used very little was reported by the Mayo Clinic. When the patient is not sufficiently strong to withstand an abdomino-perineal operation and the growth is above the peritoneum, the sigmoid and rectum are freed with mesentery and peri-rectal fat, and the bowel sectioned below the growth. The growth and sigmoid are then brought out of the wound for a permanent colostomy, after removal of the growth and a large portion of the sigmoid. The distal end of the rectum is infolded, and the sphincter cut to avoid the collecting of secretions in the rectum.

With these five operations we believe that it is possible to reduce the immediate mortality to a reasonable percentage, 10 per cent., or below, and at the same time give the patient the nearest approach to the ideal, the abdomino-perineal operation of Miles.

It is important, we believe, to be equipped with an operation suitable for any type of case, for removal of the growth should be undertaken whenever there is a reasonable hope of success. While a colostomy alone may give some relief, it is not to be compared to the relief obtained by removal of the growth, and we consider that the patient is repaid if he gets one year of comfort.

No operation with a mortality of 25 per cent., which has been about the average for the abdomino-perineal operation, could be considered for a disease of short duration or one in which the patient is moderately comfortable, but in carcinoma of the rectum we have a disease of long duration, an average duration of eleven months after the patient presents himself and is refused operation, also a most uncomfortable disease during those eleven months. The discomfort is so great that a mortality of 25 per cent. does not appeal to us as unreasonable. That this high mortality is necessary with a proper selection of operations, we do not believe.

Our operative mortality, as shown by the tables below, is 33 per cent. for the abdomino-perineal operation. This mortality we believe to be excessive, because it includes all cases done by us since the earliest operation. It is also excessive because the abdomino-perineal operation was attempted in all cases for a considerable period of time, and because we insisted upon section of the sigmoid and inversion of the distal end for a long period before it was appreciated that it could not be done without.

We believe that our own statistics which include all that we have done in private give a much more accurate estimate of the immediate mortality in the abdomino-perineal operation, that is, 5.3 per cent. for the one-stage operation and 10.6 per cent. for the two-stage operation, or a combined mortality of 8 per cent. Perhaps an idea of what can be done in cancer of the rectum by a judicious choice of operations is shown by the last twenty-four consecutive

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cases, without a death. These twenty-four operations include six posterior and eighteen abdomino-perineal operations. It will be seen, therefore, that it is not necessary to give up the abdomino-perineal operation because of the high mortality, but necessary rather to select the proper operation for the patient to be operated upon. That the lower mortality is not due to a more

TOTAL NUMBER OF CASES 128

Operability 52½ per cent.

Operation	Number of cases	Deaths	Mortality Per cent.	No report	Living under 3 years	Living under 5 years	Per cent. 3 year "cures"	Per cent. 5 year "cures"	Duration of life
Adomino-perineal									
One-stage	31	5	16	2	14	18	46½	18	46 mos.
Two-stage	68	20	29	5	19	29	36½	13	50½ mos.
Colostomy and perineal	23	5	22	5	9	9	11	11	39½ mos.
Harrison-Cripps	4	0	0	0	0	0	0	0	0
Kraske	1	0	0	0	0	0	0	0	0
Colostomies	62	5	8	20	0	0	0	0	10½ mos.

careful selection of cases is shown by the fact that the low mortality was obtained in the group in which the operability was 60 per cent., while the mortality of 33 per cent. was obtained in a group in which the operability was 52½ per cent.

The end results, as to local recurrence, glandular, visceral, and bone metastasis have been very disappointing because of our inability to get many

TOTAL NUMBER OF CASES 50

Operability 60 per cent.

Operation	Number of cases	Deaths	Mortality Per cent.	No report	Living under 3 years	Living under 5 years	Per cent. 3 year "cures"	Per cent. 5 year "cures"	Duration of life
Abomino-perineal									
One-stage	19	1	5.3	0	13	15	60	33	45½ mos.
Two-stage	19	2	10.6	0	8	11	55	33	49 mos.
Colostomy and perineal	12	2	16	2	5	5	0	0	12½ mos.

of our patients to return, because of the fact that many come from a considerable distance. Letters from patients, or the doctors in charge of the cases, are of very little value.

The statement of the pathologist, that 68 per cent. of the cases operated upon show no involvement of peri-rectal tissue or glands, is of interest because it bears out Hausmann's statement that the growth is confined to the bowel in

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50 per cent. of the cases. The same answer must be made to the statement of the pathologist as to that of Hausmann, that is, all but 11.3 per cent. or less of the cases seen are dead within five years, whether there are metastases found outside the bowel or not.

Total number of cases	116
Pathological report missing	6
Number of cases under consideration	110
Glands of pelvis involved at operation	24
Liver metastases at operation	4
Peri-rectal tissue involved	16
Prostate involved	2
Metastases outside of bowel	46
Percentage of cases with metastasis at time of operation	42%

Probably the most significant statement is that of the cases operated upon: fifteen died in three years or less, and 92 per cent. of these cases had metastases in the liver, regional glands, or had peri-rectal involvement at the time of operation.

Number of patients who died three years or under	15
Liver, mesenteric glands, or peri-rectal tissue involved at time of operation.	92%
Liver	2
Mesenteric glands	6
Peri-rectal tissue	3
No pathological report	2
No metastases outside bowel wall	2

In contrast to this, there were twenty-two cases living three or more years and in only 23 per cent. were the glands or peri-rectal tissue involved at the time of operation.

Total number living three or more years.....	24
No pathological report.....	2
Number of cases under consideration.....	22
Metastases outside of bowel wall.....	5
Metastases outside of bowel wall.....	23%

There were metastases in the liver in 5 per cent. of the total number of cases seen, that is, 245.

As to the recurrences, very little of value can be determined from our statistics, as we were able to get reports on only twenty-two cases, and we do not feel that they are very accurate.

There were metastases in the liver once, pelvic glands once, inguinal glands from growth above the sphincter twice, abdominal wound once, and perineal wound three times. The pelvis was apparently the seat of recurrence in fourteen cases.

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POST-OPERATIVE INVOLVEMENT

Liver.....	1
Glands in abdomen.....	1
Glands in groin.....	2
Abdominal wound.....	1
Perineal wound.....	3
Pelvis.....	14
	<hr/>
	22

While it is evident from these statistics that 92 per cent. of the cases dying within three years had involvement of the liver, regional glands, or peri-rectal tissue, at the time of operation, it would not be wise to give up operating upon these cases for twenty-three per cent. of those having metastases in the regional glands or peri-rectal tissue, live three or more years, and we believe very firmly that a patient is well repaid for the discomforts of the operation if he gets a year of comfort.

MASSACHUSETTS GENERAL HOSPITAL SCHEME FOR REPORTING END RESULTS

A. Total Entries		284
B. Re-entries		0
C. Recurrences from Previous Operations.....		2
C. Refused Operation.....		38
D. Cases available for Study.....		244
E. Radical Operations.....		128
F. Palliative.....		60
G. Exploratory and No Operation		56
H. Operative Deaths.....		36
I. Operative Mortality		
(a) Radical Operation	31	24%
(b) Palliative Operation	5	8%
(c) Exploratory Operation	0	0%
J. Operability. Radical.....		52½%
K. Operability. All Operations		82½%
L. Inclusive. Lack Pathological Report.		0
M. Inclusive. Untraced.		12
N. Useless for this Series		
(a) Exploratory or No Operation.....		56
(b) Colostomies.....		60
		<hr/>
		128
O. Cases available for End Results.....		116
P. Abdomino-Perineal Operations		92
Q. Perineal Operations.....		23
R. Number of Cases Living Three Years		25
S. Number of Cases Died without Recurrence		0
T. Number of Three Year "Cures" Abdomino-Perineal		23
U. Number of Three Year "Cures" Radical Operation		2
V. Percentage of Three Year "Cures" Radical Operation.....		40%
W. Percentage of Three Year "Cures" Perineal Operation.....		15%

END RESULTS OF THE SURGICAL TREATMENT OF CARCINOMA OF THE CERVIX UTERI*

BY LINCOLN DAVIS, M.D.

OF BOSTON, MASS.

THE enthusiastic acclaim which has greeted the use of radium in the treatment of cancer of the cervix has well nigh put a stop to the operative treatment of this disease, in many of the large clinics of this country. So far has the pendulum swung, that one now hears the radical operation called some very hard names by those who formerly were its ardent supporters. While well aware of the remarkable effects of radium upon certain types of cancer, and willing to grant that as a palliative measure in cancer of the cervix it has no equal, I must confess to an unwillingness as yet to abandon the operative treatment of this disease in appropriate cases, until more evidence of lasting cures by radium is at hand. Radium by its encouraging results in advanced cases has doubtless earned for itself the right to a fair trial alongside of surgery in the more favorable cases. It is obviously unfair to refer for treatment by radium only hopelessly advanced cases while retaining all early cases for surgical treatment. The employment of radium, however, in locally favorable cases in which there are contra-indications to surgical operation on the part of the general system, should provide in due time ample means for a fair comparison of results obtained by both procedures.

This small series of cases is presented as a feeble, perhaps, but nevertheless sincere, protest against the premature abandonment of a procedure which has proved itself of real curative value in the past, and is I believe capable of a still better record in the future, until the superiority of radium to surgery has been definitely established.

Dr. Farrar Cobb † reported in 1920 a series of thirty-five cases of radical abdominal hysterectomy for cancer of the cervix with an operative mortality of 11.6 per cent. and 57 per cent. of five-year "cures." Twenty-six of his cases were from the records of the Massachusetts General Hospital in the period from 1901-1915, with eleven five-year "cures," or 42 per cent.

Since September, 1915, I have had the opportunity of taking up the assignment of the operative treatment of cancer of the cervix at the Massachusetts General Hospital, and have continued it since, with an interruption of a little over two years, occasioned by the war. The number of cases subjected to radical operation has been small, but the results, although not quite equalling those of my predecessor, have been sufficiently encouraging to warrant, I believe, a continuance of the procedure in appropriate cases for the present.

Operation.—Total abdominal hysterectomy, including a liberal cuff of

* Read before the American Surgical Association, May 1, 1922.

† Journal A. M. A., January 3, 1920, vol. lxxiv pp. 14-17.

vaginal wall, and wide removal of parametrial tissue, is the operation of choice. This operation has been done in thirty-one cases. Systematic dissection of the pelvic lymph-nodes has not been attempted. Ligation of the internal iliac arteries has not proved in my hands to be of material advantage, and has been given up since the early cases. In cases presenting a bulky cauliflower outgrowth from the cervix, filling the vault of the vagina, preliminary curettage and cauterization, followed ten days later by radical hysterectomy, has been done. Otherwise the operation is done in a single stage without cauterization or curettage of the growth.

Simple curettage and cauterization, or cauterization combined with ligation of internal iliac and ovarian vessels, has been done in a number of cases in earlier years as a palliative measure, but lately has been entirely abandoned in favor of radium in those cases in which radical operation is contra-indicated.

Vaginal hysterectomy has been done in a single case in which the disease was discovered at an early stage and seemed to be entirely confined to the cervix. This procedure is not advocated except under unusual circumstances.

Operative Mortality.—In the total of thirty-two cases of hysterectomy for cancer of the cervix, thirty-one radical abdominal operations and one vaginal hysterectomy, there have been three operative deaths, an operative mortality of 9.3 per cent. There has been no mortality in the twelve cases operated on since 1917.

Operability.—In estimating the final value of any operative procedure for the cure of cancer, the operability rate is the crux of the situation. Statistics are notoriously plastic, and in no respect are they more so than in regard to operability. The figures in this series of cases are compiled solely from personal cases examined at the Massachusetts General Hospital, in the period from 1910–1922, and do not include a considerable number of cases which entered the services of other surgeons on the staff during this time. From September, 1915, to May, 1917, and from July, 1919, to date, during which periods I have held the special assignment of these cases, practically all such entries have been referred to my service. On the whole the cases seen represent a fair cross-section of the material which enters this hospital, no selection of cases being possible. Excluding re-entries there have been eighty-five cases of unquestionable carcinoma of the cervix examined by me, of these thirty-two have been subjected to an operative attempt at cure by hysterectomy. The operability rate for the entire period is 37.6 per cent.

Since July, 1919, the radical operability rate has fallen still further to 33 per cent. of the thirty-six cases seen, in spite of an active publicity campaign carried on in the community with the object of securing early recognition of the disease.

Standard of Operability.—This is difficult to express in words. Hysterectomy has been undertaken in all cases in which the disease was apparently confined to the cervix, or had invaded the vaginal walls to a limited extent. Mere bulk of the cervical outgrowth into the vagina, has not been considered

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a contra-indication, nor has limited parametrial invasion. Actual involvement of the rectal or vesical walls is now considered a contra-indication, also massive infiltration of the broad ligaments, as determined by rectal palpation. Mere fixation of the growth in the pelvis has not been found to be a contra-indication, as in several cases this has been proved by laparotomy to be due to inflammatory exudate and adhesions.

In the early cases, unwise attempts were made at radical removal when the growth was very extensive, necessitating resection of portions of the bladder and rectum; such radical procedures led to distressing complications and sequelæ in the nature of fistulæ, and in no case resulted in cure, and are not now undertaken. Cases operable as far as the local disease is concerned, but which presented contra-indications elsewhere in the body, as, for instance, by reason of obesity, diabetes, cardiac or pulmonary disease, have been referred for radium treatment, and offer a fair measure of comparison of results which will guide our future policy in handling this disease.

Every case without exception in which the radical operation has been done presented unmistakable clinical evidence of the disease in the cervix. There was not a single case of precancerous type, or of unsuspected microscopic diagnosis.

Complications.—It cannot be denied that there have been distressing complications, following the radical operation, in those patients who have survived. Of the seventeen survivors of the radical operation performed more than five years ago, there were four afflicted with urinary fistulæ. In one of these cases the fistula fortunately closed spontaneously during convalescence. In another case a vesico-vaginal fistula was successfully repaired at a later operation. In one case in which a portion of the rectum was deliberately resected on account of infiltration of its wall by malignant disease, there was a recto-vaginal as well as a vesico-vaginal fistula. As signs of recurrence rapidly ensued in this case, attempts at repair were not persisted in. In the fourth case, a ureteral fistula, there was also rapid recurrence, so that operative repair was not attempted. Post-operative shock was noted in three cases. Pyelitis, phlebitis, cystitis, and wound sepsis were recorded once each as complications occurring during the course of convalescence.

The prevalence of urinary fistulæ in these cases can be ascribed largely to errors of technic and judgment. The operator was acquiring his early experience. A more conservative selection of cases, with substitution of rubber or rubber tissue for gauze drainage, avoidance of stripping bare the ureter for considerable distances, and gentleness in its handling, have reduced the incidence of this most distressing sequela in later cases, and yet with all care, ureteral fistula the result of necrosis remains the great bugbear of the operation, an inherent risk of thorough removal of parametrium.

End Results.—Only cases operated on prior to May, 1917, are available for the study of end results. There have been twenty cases of attempted operative cure during this period, nineteen radical abdominal hysterectomies

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TABLE I
End Results: Carcinoma Cervix Uteri
(Greenough Formula).

A. Total of personal cases (1910-1922).....	91
B. Re-entries.....	0
C. Recurrence from previous operation }	6
D. Cases available for study of operability, mortality, etc.....	85
E. Radical operation.....	32
F. Palliative operation.....	35
G. No operation.....	18
H. Operative deaths.....	4
Radical operation.....	3
Palliative operation.....	1
I. Operative mortality	6%
Radical operation.....	9.3%
Palliative operation.....	2.8%
J. Operability: Radical.....	37.6%
K. Operability: All operations.....	78.7%
L. Inconclusive cases: Lack pathological examination. Pathological examination in all operated cases)	
M. Inconclusive cases: Untraced. (All operated cases traced)	
N. Inconclusive cases: Died within time limit without recurrence..	0
O. Cases available for end-result data, i.e., cases operated upon previous to May, 1917.....	46
P. Radical operations.....	20
Q. Palliative operations.....	26
R. No operations.....	0
S. Number of cases alive and well (5 years).....	7
T. Number of cases died without recurrence	1
U. Number of 5-year "cures" (all operations).....	8
V. Number of 5-year "cures" (radical operation).....	8
W. Percentage of "cures" (all operations)	17.4%
X. Percentage of "cures" (radical operation).....	40%

TABLE II
Results of Hysterectomy

Radical abdominal hysterectomies.....	31
Vaginal hysterectomy.....	1
Total.....	32
Operative deaths.....	3
Mortality.....	9.3%
Cases operated on previous to May, 1917.....	20
Number of cases traced.....	20
Alive and well over 10 years.....	1
Died of cerebral hemorrhage, without signs of recurrence 7 years after operation.....	1
Alive and well over 5 years.....	6
(One case reported well by letter, 4 years and 4 months after operation showed beginning local recurrence at end of 5th year.	
Died 5 years and 10 months after operation.).....	1
Recurrence in 2¾ years.....	1
Recurrence within 1 year.....	7
Operative deaths.....	3 15%
5-year "cures".....	8 40%

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and one vaginal hysterectomy. All cases have been proved to be cancer of the cervix by microscopic examination of the tissue removed. All twenty cases have been traced.

In three cases death occurred as an immediate result of the operation, giving an operative mortality of 15 per cent. This percentage has been reduced by subsequent cases to less than 10 per cent.

In seven cases the patients are now living and well, more than five years after operation.

In one of these cases, more than ten years has elapsed since the operation.

In one case the patient died of cerebral hemorrhage without sign of recurrence, seven years after operation.

This gives a total of eight five-year "cures," or 40 per cent.

Recurrence.—Recurrence of disease has been noted in a total of nine cases; it took place within one year of operation in seven cases.

In one case recurrence was first noted two years and nine months after operation.

In one case, reported well by letter four years and four months after operation, local recurrence was noted at the end of the fifth year. The patient died five years and ten months after operation.

All recurrences in these cases were local in the pelvis, except in one where the stomach and liver were stated by the attending physician to be the site of recurrence.

One case classed as a "cure" in which death from cerebral hemorrhage occurred seven years after operation, might be objected to on the ground that the cerebral condition was in the nature of a recurrence. The fact that the patient had been repeatedly examined during the first five years and found free from recurrence, and that her cerebral attack occurred very suddenly during apparent good health, and finally that there had been a previous hemiplegia prior to operation, amply justifies, I think, the exclusion of recurrence as a factor in this case.

If the three-year period of freedom from recurrence is taken as a standard of "cure" the percentage would be raised only five points to 45 per cent.

The most gratifying evidence of the efficacy of the radical abdominal operation is furnished by two cases, hospital numbers 209616 and 212108, in which microscopic examination of the specimens removed showed definite infiltration of epidermoid cancer into the tissues of the parametrium, yet the patients remain well more than five years after operation.

ABSTRACTS OF CASES OF HYSTERECTOMY FOR CANCER OF CERVIX PREVIOUS TO MAY, 1917, MASSACHUSETTS GENERAL HOSPITAL

CASE I.—F. M. T. Hospital No 170,569 E. S. July 1 1920. Age thirty-five. Married, no children, two miscarriages. Referred from Free Hospital for Women, Brookline. Shock five years ago with hæmiplegia which has partially cleared up.

Symptoms.—Constant flowing for three months.

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Examination.—Very obese anæmic woman. Vault of vagina occupied by friable bleeding growth. Some thickening in region of both broad ligaments.

Operation.—Preliminary curettage and cauterization. Ten days later radical abdominal hysterectomy.

Complications.—Vesico-vaginal fistula successfully repaired at second attempt in December, 1910.

Pathological Report.—Carcinoma of cervix. F. C. Kidner.

Result.—September 12, 1916, personal examination: No recurrence. General health excellent. March 3, 1920, letter from a friend, states that patient died suddenly of cerebral hemorrhage, July 29, 1917. Her health had been excellent up to this time.

CASE II.—C. M. D. Hospital No. 177308 E. S. July 21, 1911. Age forty-two. Married.

Symptoms.—Excessive flowing for several years. Pain in lower abdomen and back for four months. Two months ago had some operation on womb at another hospital.

Examination.—Cervix lacerated and nodular; small cauliflower outgrowth from cervix; uterus movable.

Operations.—Preliminary curettage; radical abdominal hysterectomy, ten days later.

Complications.—None.

Pathological Report.—Carcinoma of cervix. H. F. Hartwell.

Result.—August 14, 1913, patient writes "feel grand, gained 40 pounds. January 25, 1915, personal examination, condition excellent; no recurrence. October 25, 1921, patient reports by letter, that she is in perfect health. Has led an active out-of-door life in the mountains of Colorado during past summer.

CASE III.—J. B. F. Hospital No. 183959 E. S. July 24, 1912. Age seventy-three, widow, menopause twenty years ago. Seven children.

Symptoms.—For six months pain and soreness in lower abdomen and frequency of micturition. Bloody discharge, for six weeks. Has lost 20 pounds in six months.

Examination.—Cervix lacerated; bleeds on touch; uterus enlarged and movable.

Operation.—Radical abdominal hysterectomy, both broad ligaments markedly infiltrated by disease.

Complications.—Ureteral fistula.

Pathological Report.—Epidermoid cancer of cervix. H. F. Hartwell.

Result.—Rapid recurrence in pelvis with hydronephrosis. Died, February 22, 1913.

CASE IV.—A. V. D. Hospital No. 188637 E. S. April 17, 1913. Age fifty-eight. Widow. Menopause five years ago. One child, one miscarriage.

Symptoms.—Two months ago noticed bloody discharge. No pain. Easily fatigued.

Examination.—Small frail woman. Soft friable bleeding mass protrudes from cervix. Uterus somewhat fixed. Vaginal wall involved.

Operation.—Preliminary curettage and cauterization followed in 11 days by radical abdominal hysterectomy. Resection of portion of bladder and rectum on account of invasion by growth, with suture.

Complications.—Rectal and vesical fistulæ. May 27, 1913, unsuccessful attempt made to repair fistulæ.

Pathological Report.—Cancer of cervix. Infiltration of outer wall of intestine. W. F. Whitney.

Result.—Rapid local recurrence. Died of the disease, March 13, 1914.

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CASE V.—L. F. Hospital No. 201203 E. S. April 9, 1915. Age forty-three, married. Seven children, one miscarriage.

Symptoms.—Two months ago bleeding after coitus. For the last month flowing has been constant. No pain.

Examination.—Short obese woman with protuberant abdomen. Hard irregular nodular cervix with induration in left broad ligament.

Operation.—Radical abdominal hysterectomy.

Pathological Report.—Carcinoma of the cervix. W. F. Whitney.

Result.—Death from shock in a few hours.

CASE VI.—S. I. Hospital No. 202459 E. S. June 21, 1915. Age forty, married. Five children, three miscarriages.

Symptoms.—Constant obese woman for six months, indefinite pelvic pain.

Examination.—Cervix hard and nodular, somewhat fixed.

Operation.—Radical abdominal hysterectomy.

Complication.—Bladder wall lacerated-sutured.

Pathological Report.—Squamous-cell carcinoma. J. H. Wright.

Result.—Death from shock in six hours.

CASE VII.—M. F. W. Hospital No. 204342 E. S. September 23, 1915. Age fifty-six, widow, one child. Menopause 10 years ago.

Symptoms.—Slight show of blood five years ago. Repeated hemorrhages during last year. No pain.

Examination.—Small cauliflower growth of cervix with ulceration and sloughing. Uterus freely movable.

Operation.—Radical abdominal hysterectomy.

Complication.—Phlebitis of left leg.

Pathological Report.—Carcinoma of cervix. W. F. Whitney.

Result.—January 19, 1920, patient reports by letter that she is well and working every day. September 24, 1920, slight recurrence detected in the vault of vagina, B Radium. Death in July, 1921, "cancer of bladder."

CASE VIII.—A. M. Hospital No. 205520 E. S. December 3, 1915. Age fifty-four, married. Menopause eight months ago. Two children, two miscarriages.

Symptoms.—"Ulcerated womb" for over twenty years. For six months blood tinged, offensive discharge, with pelvic pain.

Examination.—Cervix hard and nodular. Palpation caused profuse bleeding, requiring packing.

Operation.—Radical abdominal hysterectomy.

Complications.—None.

Pathological Report.—Carcinoma of cervix. W. F. Whitney.

Result.—January 4, 1917, granulating surface in vault of vagina, bleeds on touch. B Radium. November 18, 1918, definite recurrence in right side of pelvis.

CASE IX.—A. W. Hospital No. 208443 E. S. May 24, 1916. Age thirty-eight, married, eight children.

Symptoms.—Severe pain in lower abdomen for three months. Bleeding on coitus. Laparotomy at another hospital three months ago. Blood-vessels tied, nothing removed. Cervix cauterized.

Examination.—Friable, bleeding mass in vault of vagina, resistance in both lateral cul-de-sacs. Fundus retroverted.

Operation.—Radical abdominal hysterectomy.

Complications.—Some post-operative shock.

Pathological Report.—Carcinoma of cervix. W. F. Whitney.

Result.—February 12, 1920, feels perfectly well. Personal examination shows no sign of recurrence. November 3, 1921, patient writes that her condition is excellent.

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CASE X.—M. C. S. Hospital No. 208619 E. S. May 31, 1916. Age fifty-two, married, eight children.

Symptoms.—Persistent flowing for eight months. Heavy bearing-down pain in pelvis.

Examination.—Poorly nourished woman. Uterus movable, prolapsed, with a crater at cervix.

Operation.—Radical abdominal hysterectomy.

Complications.—None.

Pathological Report.—Carcinoma of cervix. H. F. Hartwell.

Result.—December 2, 1921, excellent health. Examination shows no sign of recurrence. Patient shown at meeting of Clinical Surgical Society in Boston.

CASE XI.—A. B. Hospital No. 208709 E. S. June 5, 1916. Age sixty-two, married. Menopause, sixteen years ago. One child.

Symptoms.—Flowing began two months ago, and has continued since. Pelvic pain for last few days.

Examination.—Cervix replaced by a hard mass with a crater in centre, marked infiltration in post cul-de-sac.

Operation.—Radical abdominal hysterectomy.

Complications.—Pyelitis.

Pathological Report.—Carcinoma of cervix. H. F. Hartwell.

Result.—Patient died of the disease in 1917.

CASE XII.—C. B. Hospital No. 209134 E. S. June 30, 1916. Age forty-four, married, one child, one miscarriage.

Symptoms.—Nine months ago noticed bloody discharge from vagina after a douche. For the last four months has had a persistent profuse watery discharge. No pain.

Examination.—Friable nodular mass projecting from both lips of cervix. No induration in broad ligaments.

Operation.—Preliminary curettage and cauterization. Ten days later, radical abdominal hysterectomy.

Complication.—Some post-operative shock.

Pathological Report.—Carcinoma of cervix. H. F. Hartwell.

Result.—Patient died of the disease in 1917.

CASE XIII.—P. P. Hospital No. 209616 E. S. July 24, 1916. Age forty-seven, widow; eleven children.

Symptoms.—Pain in lower abdomen. No note as to bleeding.

Examination.—Cervix replaced by hard ulcerated bleeding mass fixed in the right vault.

Operation.—Radical abdominal hysterectomy.

Complications.—Temporary leakage of urine, which ceased spontaneously in a few days.

Pathological Report.—Carcinoma of cervix, with invasion of right parametrium. H. F. Hartwell.

Result.—November 4, 1921, patient has every appearance of perfect health. No symptoms. No evidence of recurrence on examination.

CASE XIV.—K. P. Hospital No. 211552 E. S. November 10, 1916. Age forty-nine, widow, one child.

Symptoms.—Irregular flowing for eight years. No pain, has lost fifty pounds in one year.

Examination.—Cervix replaced by a fungating, ulcerating growth.

Operation.—Radical abdominal hysterectomy.

Complications.—None.

Pathological Report.—Epidermoid carcinoma of cervix. H. F. Hartwell.

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Result.—Letter from local physician states patient was well and working when last seen in summer of 1921.

CASE XV.—A. L. B. Hospital No. 212108 E. S. December 11, 1916. Age fifty-three, married; three children. Menopause five years ago.

Symptoms.—Heavy feeling in pelvis and backache for four years. Two months ago first noticed brown watery discharge.

Examination.—Nodular growth involving cervix, with infiltration of vaginal wall. Left broad ligament infiltrated. Uterus somewhat movable.

Operation.—Radical abdominal hysterectomy.

Complications.—Post-operative shock.

Pathological Report.—Epidermoid carcinoma of cervix, with infiltration into left parametrium. H. F. Hartwell.

Result.—May 29, 1920, feels well. Personal examination showed no evidence of recurrence. Letter of October, 1921, states that her health continues excellent.

CASE XVI.—T. B. Hospital No. 213354 E. S. February 16, 1917. Age forty-seven, married, two children.

Symptoms.—For ten months irregular flowing. No pain.

Examination.—Well-developed stout woman. Cervix replaced by a crater with indurated edges. No evidence of involvement of broad ligaments.

Operation.—Radical abdominal hysterectomy.

Complications.—Clamps left on vessels of pelvic wall for three days.

Pathological Report.—Carcinoma of cervix. H. F. Hartwell.

Result.—Death from peritonitis on the fourth day after operation.

CASE XVII.—J. A. R. Hospital No. 213387 E. S. February 21, 1917. Age fifty-three, widow, one child, one miscarriage.

Symptoms.—One year ago first noticed a pinkish-white irritating discharge from vagina. Two months ago hemorrhage from vagina. Curetting by local M.D., three weeks ago. Report cancer.

Examination.—Cervix not remarkable, uterus movable, slightly enlarged. Broad ligaments free.

Operation.—Vaginal hysterectomy.

Pathological Report.—Epidermoid carcinoma of cervix. H. F. Hartwell.

Result.—March 25, 1922, letter from local physician states that patient looks and feels well, and is working regularly as cook.

CASE XVIII.—L. G. H. Hospital No. 213721 E. S. March 12, 1917. Age twenty-nine, married, two children, one miscarriage.

Symptoms.—For two months persistent brown watery discharge. Twinges of pain in pelvis for two months.

Examination.—Well-nourished young woman. Large cauliflower mass occupies vault of vagina with induration in post cul-de-sac.

Operation.—Preliminary curettage and cauterization; ten days later radical abdominal hysterectomy.

Complications.—Wound sepsis in abdominal wall.

Pathological Report.—Carcinoma of cervix with metastasis in parametrial lymph-node.

Result.—Death from recurrence of disease in autumn of 1917.

CASE XIX.—F. W. Hospital No. 214116 E. S. April 10, 1917. Age fifty-six, married. Menopause six years ago.

Symptoms.—Three months ago first noticed cramp-like pains in lower abdomen. For one year had had watery discharge and occasional bleeding. For last three weeks bleeding has been profuse.

Examination.—Obese woman. Collar of indurated tissue surrounds cervix and extends into broad ligaments.

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Operation.—Radical abdominal hysterectomy.

Complications.—Cystitis.

Pathological Report.—Carcinoma of cervix. H. F. Hartwell.

Result.—Patient's physician states that death occurred in December, 1918, with recurrence in stomach and liver.

CASE XX.—S. A. L. Hospital No. 214350 E. S. April 17, 1917. Age thirty-nine, married, six children.

Symptoms.—Brownish offensive vaginal discharge for three months. No pain.

Examination.—Fungating, bleeding growth size of small apple, replaces cervix, vaginal walls not involved. Fundus of uterus freely movable.

Operation.—Preliminary curettage and cauterization, fifteen days later radical abdominal hysterectomy.

Complications.—Bladder opened and sutured.

Pathological Report.—Carcinoma of cervix. H. F. Hartwell.

Result.—Death from recurrence March 5, 1918.

FACTORS INFLUENCING THE LIFE EXPECTANCY OF PATIENTS OPERATED ON FOR GASTRIC ULCER*

By DONALD C. BALFOUR, M.D.
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THREE years ago I presented before this Association a paper in which it was shown that the subsequent death† rate in patients operated on for duodenal ulcer was not greater than that of the general population of similar age and sex, but that it was three times as great in patients operated on for gastric ulcer. It is well known that gastric ulcer is a more serious disease in every respect than duodenal ulcer: because of the disability from the symptoms it produces, the danger from these symptoms, the less response to medical régime, and the greater risk and the less satisfactory results of surgical treatment. The fact that the subsequent death rate in patients successfully operated on for gastric ulcer proved to be three times the death rate of a similar group of the general population, prompted me to make further investigation, the results of which I desire to place before the Association.

During a period of fifteen years, prior to January, 1921, 1280 patients with gastric ulcer were operated on in the Mayo Clinic. In this series, 195 deaths occurred following satisfactory recovery from the operation. I have endeavored by every possible means to ascertain the causes of these deaths. The information obtained by a review of case histories, by correspondence, by reëxamination, or by further operation shows very clearly that the most important single factor influencing the life expectancy of patients operated on for gastric ulcer is gastric cancer. The exact number of deaths due to gastric cancer cannot be ascertained, but it easily constitutes the most common cause of death. There is, moreover, little doubt that many of the deaths for which no cause was given were due to cancer. Exclusive of these, there were seventy-five deaths from gastric cancer, which comprise about 40 per cent. of the total number of deaths, and the remainder in which the cause is known are, with few exceptions, due to causes independent of the stomach. Gastric cancer, then, may well be regarded as the factor most worthy of consideration, necessitating a review of the pre-operative history of the patient, the character of the gross lesion found at operation, the microscopic picture of the lesion, and the operative method used in dealing with the lesion:

Patients who subsequently died of gastric cancer may be divided into two groups, those in whom the lesion was not removed, and those in whom the lesion was removed. In the first group there is a striking similarity in the description of the lesions found at operation, all conform more or less to the following operative record: "Large ulcer of posterior wall, adherent to

* Read before the American Surgical Association, May 2, 1922.

† Subsequent death in this paper refers to the deaths occurring after the dismissal of the patient from the hospital.

pancreas, involving too much of the stomach and too firmly adherent to warrant the risk of removal. Ulcer may be malignant but unable to get specimen for examination. Glands inflammatory. Posterior gastro-enterostomy." Such cases have been classified in the Clinic as ulcer, but the fact that forty patients succumbed to gastric cancer within two years of operation shows with little doubt that the condition was cancer at the time of operation and should have been classified as gastric cancer or cancer on ulcer, depending on the duration and character of the symptoms previous to operation. As a contribution to the ever-interesting subject of the liability of ulcer to cancer degeneration, I would point out that the patients who died of cancer following gastro-enterostomy or other indirect operations for supposed ulcer presented a history of gastric ulcer for an average of five and eight-tenths years before operation. These cases, at least, should be removed from the benign gastric ulcer group, and this deduction alone makes a very material difference in the life expectancy statistics which have been reported.

A few cases suggest, because of the long time between operation and death from cancer, that malignancy may have developed in the ulcer after the gastro-enterostomy. The rate of growth of gastric cancer is so variable, however, that it would be unwise to hold a positive opinion concerning such cases. There are, however, two clear indications for dealing radically with these large ulcers; namely, the ulcer may be already malignant, or it may take on malignant changes if it is not removed.

Since it is often impossible to determine from the history or any pre-operative tests, or even from operation whether these large ulcers are malignant, and since it is only in the subsequent course of these cases that the real character of an unremoved lesion becomes apparent, radical removal is essential. Radical removal of these large ulcers means, however, a considerably increased operative risk but such treatment would be justified because the subsequent death rate following gastro-enterostomy alone in such cases is at least 25 per cent. Inasmuch as the ulcers are often too large for the safe operation of local excision and gastro-enterostomy, partial gastrectomy must be employed in order to deal adequately with the lesion. When the ulcers are near the pyloric end of the stomach, pylorectomy may be performed restoring gastro-intestinal continuity by Billroth No. 2 or by Polya's method, depending on the ease of approximation of the jejunum and the stomach. Unfortunately, the desirable practice of widely resecting large ulcers cannot be applied in all cases, because of their fixation, size, and situation, or the condition of the patient. Patients in whom the lesion is irremovable and in whom time only will reveal the nature of the lesion, should be placed in a deferred classification.

Summing up the management in this group of large ulcers it may be said that, while gastro-enterostomy alone gives fairly good results for the ulcer which has not undergone malignant change, the impossibility of determining

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the question of malignant invasion at the operating table makes wide excision of such ulcers of first importance.

In the group of cases in which the ulcer was removed, there were 130 partial gastrectomies with four (3 per cent.) subsequent deaths from cancer, 296 cautery excisions and gastro-enterostomies with ten (3.3 per cent.) subsequent deaths from cancer, 172 knife excisions and gastro-enterostomies with eleven (6 per cent.) subsequent deaths from cancer and fifty-six sleeve resections with no subsequent deaths from cancer. The low mortality rate from partial gastrectomy is marred by the fact that the subsequent death rate from all causes following this operation is 18 per cent., as compared with 7.5 per cent. for knife or cautery excision with gastro-enterostomy, and 5.12 per cent. for segmental resection.

Broders has kindly examined the available specimens from patients who subsequently died from cancer which were classified as ulcer by the pathologist at the time of operation. He finds, after studying a large number of areas from each specimen, that there is evidence of malignant change in about 50 per cent. This not only illustrates the difficulty of detecting early invasion of an ulcer by cancer, but emphasizes again the necessity of most painstaking search of every gastric ulcer for evidences of cancer degeneration. The difficulties of explaining these deaths from cancer are made greater by the fact that we do not know the incidence of cancer in the stomach from which a benign ulcer has been removed.

The lesson to be learned from the group of cases in which the lesion was small enough to be subjected to excision by knife or cautery and followed by gastro-enterostomy is not clear. Since the death rate from cancer is 3 per cent. after cautery excision, 3.3 per cent. after partial gastrectomy, 6 per cent. after knife excision, and 0 per cent. after sleeve resection, the evidence certainly is in favor of the last operation. In the Mayo Clinic, however, the segmental resections have usually been made in cases in which ulcers are favorably situated and have more or less hourglass contraction, so that the applicability of the operation is limited and the results, therefore, good. Local excision followed by gastro-enterostomy for all other small ulcers seems now to be well established. With regard to the method of excision, the cautery has many advantages and I would like to direct attention to the method of employing the cautery which Sistrunk has introduced in the Clinic. Instead of burning out the ulcer, as I originally suggested, he excises the entire ulcer with the cautery knife; this secures the ulcer for microscopic examination, and the heat may be effectively employed in thoroughly searing the edges of the incision. Although the risk accompanying this method may be slightly greater than in the usual procedure, I believe it is the best technic to use when the ulcer area can be satisfactorily mobilized.

Gastric cancer, then, is the chief factor to be reckoned with in estimating the life expectancy of patients operated on for gastric ulcer. The evidence, however, indicates that in almost all of these deaths from cancer the lesion

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had already undergone malignant changes at the time of operation. For this reason sixty cases should be omitted from this series in reckoning the life expectancy of patients operated on for benign gastric ulcer. On this basis, their life expectancy is considerably better than hitherto reported and the subsequent death rate, instead of being three times the death rate of the general population of similar age and sex, is less than twice the rate.

OPERATIONS FOR GASTRIC ULCER

	Cases	Subsequent deaths
Partial gastrectomy.....	130	4 (3 per cent.)
Cautery excision and gastro-enterostomy.....	296	10 (3.3 per cent.)
Knife excision and gastro-enterostomy.....	172	11 (6 per cent.)
Sleeve resection.....	56	

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RESECTION OF THE BODY OF THE STOMACH FOR ULCER*

REPORT OF A SERIES OF CASES WITH END RESULTS

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THE impossibility of distinguishing between benign ulcer and carcinoma of the stomach without microscopic examination makes some form of removal of the ulcer necessary. If the ulcer is large or is high on the body of the stomach, if there are multiple ulcers, or if there is hour-glass constriction, resection in continuity is often the most simple operative procedure. This operation, also called transverse, sleeve, or middle gastric resection, is particularly adapted to ulcer with hour-glass deformity, as it removes the lesion and, at the same time, relieves the obstruction. While it results in the removal of more of the wall of the stomach than by simple excision, less is usually removed than by other forms of resection.

Attention has been called to the fact that a stomach in which sleeve resection has been performed will empty better than one in which a V-shaped excision has been made; this has been borne out by experimental results. The reason for this was a matter of conjecture for a long time. Alvarez, in 1919, explained it as follows: The contraction wave starts at the cardia and passes along both curvatures to the pylorus; in order that the stomach may empty completely, the waves of the two curvatures must reach the pylorus at the same time. Sometimes the arrival of one wave at the pylorus seems to block the advance of the wave on the other curvature, therefore, if part of one curvature is removed without removing the corresponding part of the opposite curvature, the wave of one side will reach the pylorus before that of the other and, thus, poor emptying will result. Alvarez, therefore, recommended the removal of a sleeve which is longer on the greater curvature than on the lesser.

The portion of the stomach removed is often the part richest in acid-secreting glands, namely the prepyloric, and theoretically this removal should result in lowering the acidity. Five of our patients had test meals before and after operation. The average time elapsing between the resection and the test made after operation was twenty-one months. The average readings before operation were: total acidity fifty-three, free hydrochloric acid forty-three. The average readings after operation were: total acidity thirty-nine, free hydrochloric acid twenty-nine, an average reduction of fourteen in total acid-

* Read before the American Surgical Association, May 2, 1922.

ity and fourteen in free hydrochloric acid. This is a very small series and a positive conclusion should not be drawn from it. De Quervain, and Faulhaber and Redwitz reported a decrease in acidity following sleeve resection. Other factors besides the removal of the acid-secreting mucous membrane may be concerned in lowering the acidity, for the acidity is always reduced after the excision of a duodenal ulcer, which does not disturb the gastric mucous membrane.

Various surgeons have advocated sleeve resection; others have condemned it, and while fairly large series of such operations have been reported from



FIG. 1.—(Case 94543). Stomach before sleeve resection, showing the niche of a gastric ulcer on the posterior wall with a wavy contraction of the greater curvature.

Germany, the procedure has never been popular. First, it is considered more difficult technically than simple excision, but we are inclined to believe that it may often be performed with less difficulty than a V-shaped excision and gastroenterostomy. Other objections have been made, namely, that the short lesser curvature is still further shortened, that it is necessary to make the resection too close to the ulcer on the lesser

curvature, and that too much of the normal wall of the stomach is sacrificed. The chief adverse criticism is that hour-glass constriction often follows.

Payr, in 1910, recommended sleeve resection in ulcers of the body of the stomach. Riedel recommended it in ulcers of the pars media, and in 1912 reported the condition of eighteen patients who had been operated on from three to eleven years previously. Four were completely cured, and fourteen were perfectly well with the exception that they were unable to eat certain heavy foods. Von Eiselsberg, in 1914, said that it is the operation of choice if the ulcer is situated at a distance from the pylorus or has involved neighboring organs. He had performed the operation in seventeen cases without secondary ulcer or other unfavorable sequelæ. Downs, in 1917, asserted that he considered sleeve resection the ideal operation for hour-glass stomach if the pylorus is not stenosed. He reported five cases, in three of which the results were perfect. One patient continued to have trouble, and one died of pneu-

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monia on the sixth day. Kloiber, in 1920, reported results following operation on eighteen patients who had been examined from two to four years afterward. Seventy-two and two-tenths per cent. were completely cured. Deaver and Reimann, in 1921, recommended the operation for large ulcers in the middle of the stomach or to the left of the middle, but advised gastro-enterostomy in addition. Wilensky, in 1921, said that the functional results of sleeve resection are quite superior to those of V-shaped excision, and recommended it for ulcers in or near the middle segment of the stomach. Lecène, in 1921, reported five cases in which operation had been performed from seven to eleven years previously. Three of the patients had not had symptoms after operation, and the other two had had slight symptoms lasting only a short time. De Quervain, in 1922, reported 90 per cent. of cures following his sleeve resections.

On the other hand, Faulhaber and Redwitz in 1914, in their experimental work, found, in every instance, constriction of the body of the stomach when healing was complete. Woolsey, in 1921, reported that his results with sleeve resection were not so good as with some other operations, but he thought this was to be expected because of the type of cases in which it had been employed. Moynihan, in 1920, mentioned that Billington had had poor results with sleeve resection, and, in 1921, he reported that the end-results were not satisfactory and he had not used the method for years. Moynihan also mentioned that Kümmel had ten cases in which hour-glass stomach had resulted. Von Schmieden, in 1921, recommended excision and reconstruction of the lesser curvature rather than sleeve resection.



FIG. 2.—(Case 94543.) Photograph of specimen showing multiple ulcers.

RESULTS OBTAINED DURING A PERIOD OF FOURTEEN YEARS

From 1908 to 1922, ninety sleeve resections were performed in the Mayo Clinic: One for angioma, one for lymphosarcoma, thirty-two for carcinoma, and fifty-six for benign gastric ulcer (Table I). Since gastric ulcer occurs three times as often in men as in women, it is remarkable that these operations for ulcer were performed on thirty-seven women and nineteen men.

The patient with angioma on whom sleeve resection was performed is now alive and without gastric complaint two years after operation. The patient with lymphosarcoma died of recurrence ten months after operation.

In two of the thirty-two patients with carcinoma, it was necessary to resect the colon at the time of the sleeve resection; in one a gastro-enterostomy

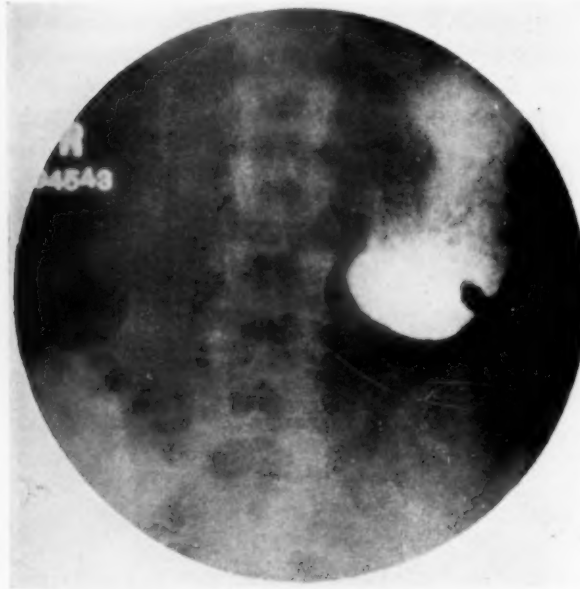


FIG. 3.—(Case 94543.) Three months after sleeve resection. Note slight contracture of the greater curvature at the line of anastomosis, not, properly speaking, hour-glass deformity.

was necessary and in one a pyloroplasty. In this group there were four operative deaths. This is a slight improvement on the average operative mortality from all resections of the stomach for carcinoma performed in the Clinic from 1897 to 1922. Two of the operative deaths were due to general peritonitis, and two to pneumonia. One of the patients who died from peritonitis also had a resection of the colon. Of the remaining twenty-eight patients

one could not be traced, and twelve are still living and without recurrence; three of these were operated on in 1921. The time since operation on the other nine living patients ranges from two years and seven months to nine years and eight months; in other words, 37 per cent. of the patients who survived

TABLE I.
Sleeve Resections.

	Men	Women	Average age, years
Angioma.....	1	.....	67
Lymphosarcoma.....	.....	1	30
Carcinoma.....	23	9	53
Ulcer.....	19	37	43

operation and who have been traced are alive and well at least two and one-half years after operation. The cause of death is not known of four of the fifteen patients who have died after leaving the Clinic; one died of uræmia and ten of recurrence. The length of life after operation in the latter group

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ranged from thirteen months to five years; the average twenty-seven months. None of the patients in whom glandular involvement was found at operation is alive (Table II).

TABLE II.
Sleeve Resections for Carcinoma; Thirty-two Cases.

	Patients
Operative deaths.....	4
No information.....	1
Died from recurrence (from thirteen months to five years after operation, average time twenty-seven months)...	10
Died from other causes.....	5
Still living.....	12
Total.....	32

As a group the fifty-six patients on whom resections in continuity were performed because of benign ulcer represent serious surgical problems. Thirteen patients had single ulcers without perforation or hour-glass constriction; eighteen had single ulcers which had perforated; seven had single ulcers with hour-glass constriction; five had single ulcers which had perforated and caused hour-glass constriction; five had multiple ulcers without perforation or hour-glass constriction; five had multiple ulcers one or more of which had perforated, in three of these duodenal ulcers were also present, and three had multiple ulcers with hour-glass constrictions (Table III). In eight instances

TABLE III.
Type of Ulcer.

	Patients
Single ulcer without perforation or hour-glass constriction.....	13
Single perforated ulcer.....	18
Single ulcer with hour-glass constriction.....	7
Single ulcer with perforation and hour-glass constriction.....	5
Multiple ulcers without perforation or hour-glass constriction.....	5
Multiple ulcers with perforation.....	5
Multiple ulcers with hour-glass constriction.....	3
Total.....	56

pyloroplasty was performed besides the sleeve resection, in one instance gastro-enterostomy, and in one resection of the colon and pyloroplasty.

In the group of patients having benign ulcer, there were three operative deaths. This is slightly higher than the average mortality (4 per cent.) in the cases of gastric ulcer in which operation was performed from 1906 to 1922, but the cases in which resection in continuity was performed represent much more serious surgical risks than the average cases of gastric ulcer. One of the operative deaths was due to hemorrhage, one to pneumonia, and one to peritonitis. A fourth patient died after leaving the Clinic. Four of

the fifty-six patients have been operated on less than one year. Of the remaining forty-eight patients, information has been obtained at least one year after operation from forty-one (85 per cent.). Fifteen of these patients report that they are completely relieved, and fourteen that they are relieved with the exception of some slight complaint; that is, 70 per cent. of the patients traced are cured. The percentage is undoubtedly higher than this, for if patients are having trouble, they are quite apt to answer questions with regard to their condition. These twenty-nine cures include three eight-year, one

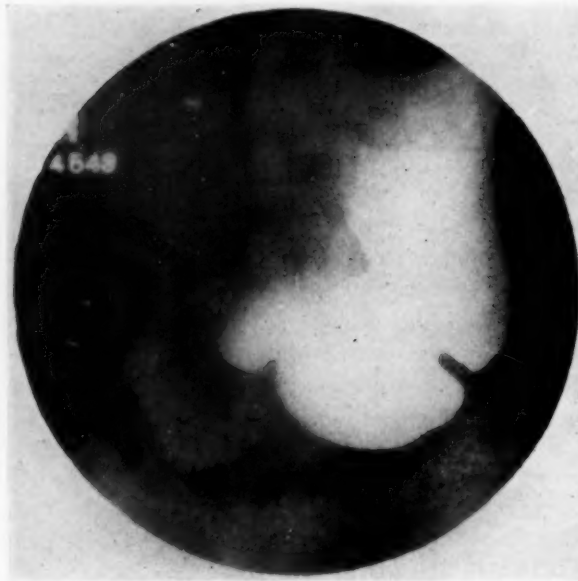


FIG. 4.—(Case 94543.) Six months after sleeve resection. The stomach has increased greatly in size.

seven-year, two six-year, four five-year, nine four-year, two three-year, three two-year cures and five between one and two years. The length of time between operation and the last report averages four years.

Six (14 per cent.) of the forty-one patients traced reported that they were improved by the operation, but that they did not consider themselves cured. Six patients reported that the operation was not satisfactory. One said that he had had no relief from the operation. One patient returned six years after

operation and a diagnosis was made of recurring ulcer. One patient had had a gastro-enterostomy fifteen years before the sleeve resection without relief. Ten months after the sleeve resection, she began to have severe epigastric pain and vomited. Five months later, exploration was performed at the Clinic and a gastrojejunal ulcer found. There was no contraction at the site of the sleeve resection. The gastrojejunal ulcer was excised, the gastro-enterostomy cut off, and a pyloroplasty made. Eighteen months afterward, the patient reported that she was almost completely relieved, but four years afterward, that she was having just as much trouble as before the operation. Complete examination of the stomach at this time, including röntgenograms, was negative. On three of the six patients whose operation had not been satisfactory it was necessary to perform gastro-enterostomy later. In one instance the operation was performed one year after the sleeve resection, because of an ulcer in the suture line on the lesser curvature. In one an anterior gastro-enterostomy was performed one year

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after the sleeve resection because of adhesions to the liver and pancreas with obstruction, and in one a posterior gastro-enterostomy was performed five years after sleeve resection because of obstruction in the vicinity of the pyloroplasty, which was made at the time of the sleeve resection. The poor result in this case may have been due to the pyloroplasty. Thus, 70 per cent. of the patients are cured and 14 per cent. improved and 14 per cent. report unsatisfactory results (Table IV). These percentages compare favorably with

TABLE IV.
Sleeve Resections for Ulcer.

	Patients
Operative deaths.....	3
Deaths since leaving the Clinic.....	1
Operation less than one year.....	4
Not traced.....	7
Cured by operation.....	29
Improved by operation.....	6
Operation unsatisfactory.....	6
Total.....	56

the results obtained in calloused ulcer of the posterior wall treated by excision and gastro-enterostomy, namely, 60.8 per cent. cured, 32.5 per cent. relieved, and 6.9 per cent. unimproved.

Fifteen patients were examined by the Röntgen-ray at periods varying from one month to six years after operation. The stomach was found to be practically normal in shape, size, and position. In five (33 per cent.) there was a slight hour-glass constriction, corresponding to the site of resection. We had occasion to explore six patients who had had sleeve resections from one to five years previously. In five of these röntgenograms had shown constriction at the site of anastomosis, but at operation no such narrowing could be found in any of the six cases. The shadow seen in the röntgenograms in the five cases was probably scar contraction, or spasm. Such spasm is relaxed by anæsthesia, which would account for the absence of the constriction at exploration.

The death rate in the first four years after operation for duodenal ulcer is practically normal, while after operation for gastric ulcer it is three times normal. W. J. Mayo has pointed out that some of the patients believed to have gastric ulcer must have had gastric cancer. In any large series of excisions of gastric ulcer, some of the patients will probably develop cancer of the stomach. So far as we know, none of our patients has developed gastric cancer following resection in continuity for benign ulcer, but in ten instances following other forms of excision second operation revealed cancer.

INDICATIONS FOR SLEEVE RESECTION

Cases in which sleeve resection had been performed were studied for the purpose of determining the immediate and ultimate results of this operation as compared with others. It is apparent that this type of operation is not

suitable for all cases; however, we believe it is the operation of choice in certain cases, and in view of the fact that favorable results were obtained in our series, we are inclined to believe that it can be employed to advantage more often than formerly. While gastro-enterostomy is usually all that is necessary in cases of duodenal ulcer, it is not sufficient in gastric ulcers for two reasons: First, the lesion in the stomach, although apparently benign,



FIG. 5.—(Case 222404.) Gastric ulcer. Hour-glass stomach.

may be malignant, and therefore must be removed or destroyed. Second, it is known that simple V-excision of a gastric ulcer may, at times, interfere with peristalsis and result in almost complete retention. Therefore, as a rule, it is necessary to make a gastro-enterostomy and cauterize or excise the ulcer, too. This plan is probably the better one to follow in most cases, although there are certain times when, as a result of the V-excision of the ulcer and closure of the opening, a very marked deformity is produced in the contour of the stomach. This is more likely to occur when the ulcer is large and is on the posterior wall, and particularly if the lesion is in the cardiac end of the stomach. We believe that the lesion is more likely to be removed thoroughly by sleeve resection than by excision. It is not always possible to determine the character of the ulcer at the time of its removal, and if it is malignant the sleeve resection would seem to be the more logical procedure. If the lesion is on the cardiac side it is apparent that the main part of the stomach will be on the pyloric side, so that any operation which would remove the pylorus would necessarily remove the larger part of the stomach. Preservation of this part of the stomach does not seem to favor recurrence. In none of our patients, so far as we know, did malignancy occur in this portion of the stomach.

In cases in which the ulcer is large, indurated, and in the central or

may be malignant, and therefore must be removed or destroyed. Second, it is known that simple V-excision of a gastric ulcer may, at times, interfere with peristalsis and result in almost complete retention. Therefore, as a rule, it is necessary to make a gastro-enterostomy and cauterize or excise the ulcer, too. This plan is probably the better one to follow in most cases, although there are certain times when, as a result of the V-excision of the ulcer and closure of the opening, a very marked deformity is produced in the contour of

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cardiac third of the stomach, a sleeve resection can be performed with less technical difficulty than excision and gastro-enterostomy, or any other form of resection, except the Balfour cautery operation. There is less actual operating than in any other procedure and usually the technical steps can be carried out more accurately. The stomach is so well supplied with vessels and nerves from each side, that almost any part or quadrant can be removed with the assurance that the repair will heal without difficulty. In none of our cases was there necrosis of the gastric wall or giving way of the suture line. In some of the cases the open end in one segment of the stomach was at least twice the diameter of the opposite segment, and it was necessary to plan the anastomosis to make these join properly, yet the healing was not interfered with. If the lesion is near the pylorus, the result of this type of excision may not be so satisfactory. In a few of our cases in which the stomach was removed almost to the pylorus, it was necessary later to make a gastro-enterostomy. In some instances, the resection was practically a Billroth

No. 1; in others, an attempt was made to enlarge the pylorus by performing a plastic operation as well as a resection. In some of these the results were satisfactory, in others the stomach did not function properly. It is possible that with technical changes, operations of this type may be made more suitable for pyloric lesions.

The principal objections to sleeve resection are that it removes too much of the unaffected gastric wall, and that it is often followed by contraction which results in hour-glass deformity. If the tumor is malignant there can be no objection to wide excision of the lesion, but if it is benign as much good tissue should be preserved as is compatible with good results. For this reason we believe it is best not to employ the procedure for small ulcers. If the ulcer is large the deformity will often be less following a sleeve resection than following excision and gastro-enterostomy



FIG. 6.—(Case 222404.) Stomach four years after sleeve resection. Considered normal roöntgenologically.

We have been impressed with the extremely good functional end results in our series of cases. In some cases there seems to be a contraction at the site of the union. As time passes we are having opportunities to examine these patients at longer intervals after operation, and our findings indicate that the objection to sleeve resection has been exaggerated. We are even doubtful in some instances if the contraction sometimes seen in the röntgenograms is a real deformity, or that it interferes with the normal function of the stomach. In any event, in no other group of cases have we had better functional results (Figs. 1-8).

DISCUSSION OF TECHNIC

The first technical step in the operation consists of separating the lesion from the surrounding structures. Often the lesion is attached to the pancreas,

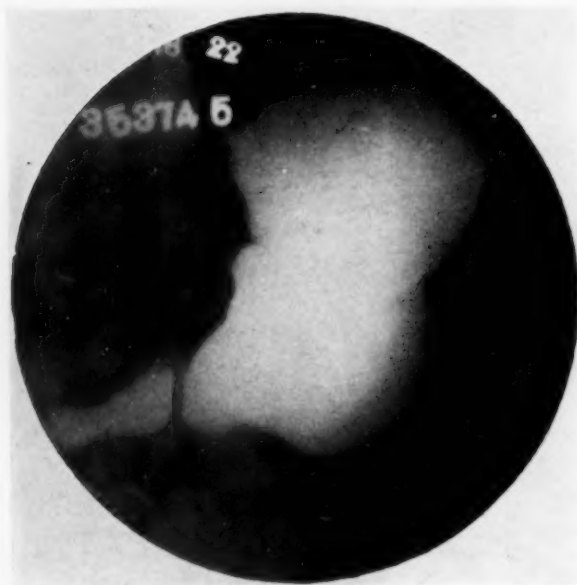


FIG. 7.—(Case 353745.) One year after sleeve resection. No evidence of recurrence. Normal röntgenologically.

a small piece of which may be excised with the lesion. We have done this in a number of instances with apparently no ill effect. In certain cases it is best to divide the stomach above or below the lesion before dissecting it free.

After the stomach has been freed, the gastrohepatic omentum is dissected away from the lesser curvature for a sufficient space and the gastrocolic omentum is separated from the greater curvature, the

amount of separation will depend on the location and suspected character of the lesion.

The area to be removed is clamped between two large Payr clamps. Rubber-guarded clamps are used to prevent soiling from the gastric contents as the segment is cut away with the cautery. These clamps are then put on each segment of stomach just beyond the large crushing clamps which are then removed and the two segments joined. Two rows of catgut sutures are used to approximate the mucous membrane, the muscularis, and the peritoneal layers, and the anastomosis is completed by one row of interrupted silk sutures. The angles at the lesser and greater curvatures are supported by suturing the several parts of the severed omentum over them.

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CONCLUSIONS

In cases of carcinoma of the stomach, the results from sleeve resection are as satisfactory as from any other form of operation.

Sleeve resection is well suited for some ulcers high on the body of the stomach, for large perforated ulcers, and for multiple ulcers. It is the ideal procedure in hour-glass stomachs.

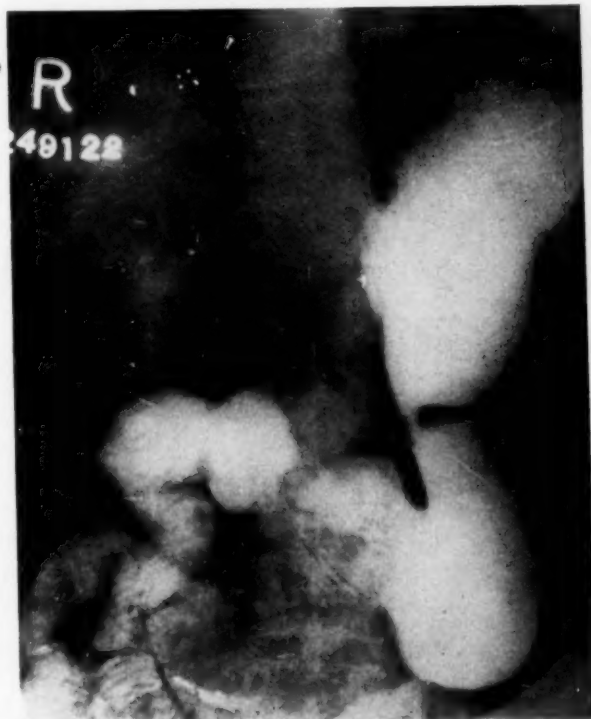


FIG. 8.—(Case 249122.) Hour-glass stomach. Ulcer and hour-glass at operation; sleeve resection. Röntgenogram two years later showed a normal stomach.

The danger of hour-glass constriction following sleeve resection has been exaggerated.

The functional results of this operation are very satisfactory.

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NOTE OF CORRECTION

T. WINGATE TODD. BONY FEATURES OF POSTERIOR CONGENITAL DISLOCATION OF THE SHOULDER

Erratum. *ANNALS OF SURGERY*, July number 1922, pp. 70-76. The legend for figure 1 has erroneously been attached to figure 2 (No. 635) and the legend for figure 2 has been attached to figure 1 (No. 363).

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